2

VOLUME III

RADIOLOGICAL CLOSEOUT DOCUMENTATION

Post Remedial Action Report Lansdowne Radioactive Residence Complex Dismantlement/Removal Project

June 1990

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RADIOLOGICAL CLOSEOUT DOCUMENTATION

Post Remedial Action Report Lansdowne Radioactive Residence Complex Dismantlement/Removal Project

Prepared By

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for

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Baltimore District, Corps of Engineers
P.O. Box 1715
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13. ABSTRACT *(Maximum 200 words)*

The Radiological Closeout Report was prepared to document the successful completion of final remediation of the USEPA Superfund Cleanup of a radium contaminated duplex residence and associated properties located in Lansdowne, ~~Pa.~~ Pennsylvania. This report addresses the Prime Contractor's efforts to provide radiological coverage of the project from initial award through final verification. The report includes plan preparation, training, personnel monitoring, air sampling, environmental compliance, radiological surveys, verification of cleanup to allowable limits, radiological techniques applied by the Prime Contractor, soil sampling and verification methods utilized. The report is formatted by major task, with associated data provided for each major task or division of work. Keywords: Radioactive contamination; Ionizing radiation; Radiation protection/dosage; Airborne/particles/sampling; Personnel/safety/monitoring; Radiation moniters; Soil surveys; Gamma ray spectroscopy; Health physics; Radioactive wastes/disposal; → (cover)

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RADIOLOGIC CLOSEOUT REPORT

TABLE OF CONTENTS

TABLE OF CONTENTS

CHAPTER 2

SURVEYS OUTSIDE RADIOLOGICALLY CONTROLLED ZONES (CONTINUED)

CHAPTER 3

HEALTH PHYSICS FILING SYSTEM (CONTINUED)

CHAPTER 4

PHASE: DISMANTLEMENT OF THE HOUSE (CONTINUED)

CHAPTER 4

PHASE: DISMANTLEMENT OF THE HOUSE (CONTINUED)

CHAPTER 4

PHASE: DISMANTLEMENT OF THE HOUSE (CONTINUED)

CHAPTER 4

PHASE: DISMANTLEMENT OF THE HOUSE (CONTINUED)

CHAPTER 5

CHAPTER 5

PHASE: DISMANTLEMENT OF THE GARAGES (CONTINUED)

CHAPTER 5

PHASE: DISMANTLEMENT OF THE GARAGES (CONTINUED)

CHAPTER 6

CHAPTER 6

PHASE: SOIL REMEDIATION (CONTINUED)

CHAPTER 6

PHASE: SOIL REMEDIATION (CONTINUED)

Appendix 6-B: Environmental Air Samples (Continued)

Appendix 6-C: Pre and Post Remedial Gamma Soil Surveys 6-C-253

CHAPTER 6

PHASE: SOIL REMEDIATION (CONTINUED)

Appendix 6-D: Initial Soil Sample Activity by Gamma Spectroscopy (Continued)

CHAPTER 6

PHASE: SOIL REMEDIATION (CONTINUED)

CHAPTER 7

LANSDOWNE

RADIOACTIVE RESIDENCE COMPLEX
DISMANTLEMENT/REMOVAL PROJECT

RADIOLOGICAL CLOSEOUT REPORT

CHEM-NUCLEAR SYSTEMS, INC.
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CHAPTER 1
PERSONNEL MONITORING PROGRAM

CLOSEOUT REPORT

PERSONNEL MONITORING PROGRAMS

TABLE OF CONTENTS

Section — Page No.

1.0 INTRODUCTION

During the period of August 1, 1988 to May 19, 1988 personnel monitoring programs were established to insure that operations conducted within a radiologically controlled area were performed in a safe manner. The goals of this program were to verify compliance with all Federal and State standards regarding personnel radiation exposure and to insure a high degree of radiological safety for site personnel. This was accomplished by performing all work operations in accord with the plans established prior to beginning site work operations. The following sections of this chapter present a description and summary of the surveys performed to verify compliance.

2.0 GENERAL

In accordance with the Safety Health and Emergency Response Plan and the Contractor's Quality Control Plan a variety of samples and measurements were acquired. On a monthly basis bioassay samples were collected, consisting of approximately 2 liters of urine from each person working continuously in a controlled area. Additional urine samples were collected on occasions where there existed an increased potential for ingestion or inhalation of radioactive material. Thermoluminescent Dosimeters (TLD) were issued on a monthly basis to each individual who routinely performed work in a controlled area. Prior to the performance of activities within the controlled area, initial whole body counting was performed. The whole body counts were repeated at the termination of a worker's employment at the project site. An access control point was established to prevent transport of contamination out of the controlled area. Finally, prior to performance of any work at the project site, whether inside or outside the controlled area, long term project workers were trained and tested in the necessary procedures and protocols which were designed to insure a safe work environment.

3.0 URINALYSIS PROGRAM

The urinalysis program covered long term project personnel. The program was designed to detect potential uptake of any of the radionuclides of concern at levels below regulatory limits. Due to the relatively low airborne activity levels expected and the sensitivity limits of the analysis method, the personnel selected for this program were those who spent more than 120 hours in any three consecutive months within a radiologically controlled area. In general, the primary exposure control methodology was based on air sample results, rather than depending on post-exposure bioassay results. Personnel who fell under the auspices of this program were Chem-Nuclear Systems, Incorporated personnel and its sub-contractors, including Carlucci Construction Company, General Security Incorporated, and Hilbert and Associates Incorporated. Also covered under this program were Army Corps of Engineers

personnel who had specifically requested inclusion.

The program provided for collection of an initial urine sample which was analyzed for Radium-226 and Thorium-230. This sample was used as the "baseline" measurement, and served to identify any previously existing concentrations of these isotopes. Subsequent urine samples were collected on a monthly basis (typically, the first of each month). At the end of a worker's employment a final urine sample was collected.

The purpose of the program was to identify any significant change in subsequent samples from the baseline sample and to follow the recommendations set forth in Report 30 by the International Commission for Radiation Protection (ICRP) for uptake of Radium-226 and Thorium-230. In accordance with these purposes, the following criteria were established:

Radium-226	Thorium-230	Action
0.05 pCi/l	0.05 pCi/l	Resample
0.70 pCi/l	0.10 pCi/l	Investigate work conditions
1.00 pCi/l	0.20 pCi/l	Prohibit employee from performing work in a radiologically controlled zone

Data for personnel covered under the urinalysis program are presented in Appendix A of this document. The data indicate no significant difference between the baseline sample results and the final sample results. Although minor deviations from the baselin do exist, these differences are within those expected due to counting statistics and uncertainties associated with the analysis procedures.

4.0 DOSIMETRY PROGRAM

The dosimetry program was designed to measure the beta/gamma dose from site activities to long term project personnel. Such personnel were defined as those who spent more than 120 hours in any three consecutive months within a radiologically controlled area. Personnel who fell under the auspices of this program were CNSI personnel and its sub-contractors, including Carlucci Construction Company, General Security Incorporated, and Hilbert and Associates Incorporated. Also covered under this program were certain Army Corps of Engineers personnel.

Personnel exposure was monitored with Thermoluminescent Dosimeters (TLDs). The TLD dose records are provided for site

personnel as Appendix B to this document. Although the TLDs were exchanged on a monthly basis, the results are reported as a quarterly summary in accordance with normal CNSI dosimetry department procedure. Each quarter (numbered 1 to 4) is further divided to indicate the deep (D) and shallow (S) dose component for that time period. The deep dose component is equivalent to a whole body dose, the shallow dose component is equivalent to a skin dose. The deep dose received in January would therefore appear in the column titled "Q1-D", while the shallow dose received in September would be located in the column titled "Q3-S".

Throughout the course of the project, TLD results were lower than the administrative limits established by CNSI. As can be seen from a review of the Safety Health and Emergency Response Plan, the limits established by CNSI are well below the limits established in Title 10 of the Code of Federal Regulations, Part 20.

One anomalous reading was observed for a TLD issued to R.J. Fello in April of 1989. The accompanying dosimeter investigation report is also provided in Appendix B of this document. The investigation of the work areas indicated the level shown from the TLD was not supported by work area monitoring results or by TLD results for other work crew members. However, even if it was assumed that the results were accurate, the exposure values would still be well below the allowable limit for radiation workers.

5.0 WHOLE BODY COUNTS

The whole body count program covered long term project personnel. The program was designed to perform uptake analysis of personnel who spent more than 120 hours in any three consecutive months within a radiologically controlled area. Personnel who fell under the auspices of this program were Chem-Nuclear Systems, Incorporated personnel, its sub-contractors, including Carlucci Construction Company, General Security Incorporated, and Hilbert and Associates Incorporated. Certain personnel from the Army Corps of Engineers and the United States Environmental Protection Agency were also included.

The program consisted of initial whole body counts which measured the quantities of Radium-226 and Thorium-232 which were present in the body prior to the performance of any site activities, and then final measurements to determine the levels present at the termination of site radiological work. This data was used to compliment the monthly urinalysis program, previously described.

The measurements were accomplished by utilizing a very sensitive sodium iodide detector in conjunction with a multi-channel analyzer. The body counts consisted of two measurements, a whole body scan which surveyed for Radium-226, and a stationary, lung

count which surveyed for Thorium-232. The calculated minimum detectable activity for natural thorium was 4.7 mg, and the calculated minimum detectable activity for Radium-226 was 4.1 nCi. The results of these surveys are provided as Appendix C to this document. It should be noted the values of radionuclides initially present versus the level of radionuclides present at the final count do not constitute a statistically significantly difference. This indicates that there was no measurable intake of these radionuclides due to site activities.

APPENDIX 1-A

URINALYSIS RESULTS

URINALYSIS RESULTS

ID: 1905

Date	Ra-226		Th-230	
8/25/88	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
9/01/88	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
BASELINE				
9/18/88	0.00 +/-	.30 pCi/l	0.00 +/-	.01 pCi/l
10/13/88	0.00 +/-	.20 pCi/l	.02 +/-	.02 pCi/l
11/08/88	0.00 +/-	.30 pCi/l	0.00 +/-	.01 pCi/l
12/12/88	.20 +/-	.30 pCi/l	0.00 +/-	.01 pCi/l
1/07/89	.10 +/-	.30 pCi/l	0.00 +/-	.01 pCi/l
2/07/89	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
3/07/89	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
3/10/89	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l

ID: 1913

Date	Ra-226		Th-230	
8/15/88	0.00 +/-	.10 pCi/l	.01 +/-	.01 pCi/l
9/01/88	0.00 +/-	.10 pCi/l	.01 +/-	.01 pCi/l
BASELINE				
9/07/88	0.00 +/-	.50 pCi/l	0.00 +/-	.01 pCi/l
10/13/88	0.00 +/-	.20 pCi/l	.01 +/-	.01 pCi/l
11/08/88	.10 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
1/05/89	.10 +/-	.30 pCi/l	0.00 +/-	.01 pCi/l
1/07/89	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
2/07/89	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
3/07/89	0.00 +/-	.20 pCi/l	.01 +/-	.01 pCi/l
3/10/89	0.00 +/-	.20 pCi/l	.01 +/-	.01 pCi/l

ID: 3155

Date	Ra-226		Th-230	
8/15/88	.10 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
9/01/88	.10 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
BASELINE				
9/18/88	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
10/13/88	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
11/08/88	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
1/05/89	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
1/07/89	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
2/07/89	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
3/07/89	0.00 +/-	.90 pCi/l	0.00 +/-	.01 pCi/l
3/10/89	0.00 +/-	.90 pCi/l	0.00 +/-	.01 pCi/l

ID: 1133

Date	Ra-226		Th-230	
8/15/88	.10 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l

Note: Bioassay result of 0 indicates < MDA

9/01/88	.10 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
BASELINE				
9/18/88	+/-	pCi/l	0.00 +/-	.01 pCi/l
INSUFFICIENT SAMPLE FOR RA226 ANALYSIS				
10/13/88	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
11/08/88	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
12/12/88	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
12/12/88	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l

ID: 1655

Date	Ra-226		Th-230	
8/25/88	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
9/01/88	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
BASELINE				
9/18/88	.20 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
10/13/88	0.00 +/-	.10 pCi/l	.02 +/-	.02 pCi/l
11/05/88	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
HIGH POTENTIAL EXPOSURE				
12/12/88	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
1/07/89	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
2/07/89	1.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
3/07/89	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
3/10/89	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l

ID: 2043

Date	Ra-226		Th-230	
8/25/88	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
9/01/88	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
BASELINE				
9/18/88	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
10/13/88	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
11/08/88	.10 +/-	.30 pCi/l	0.00 +/-	.01 pCi/l
12/12/88	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
1/07/89	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
2/07/89	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
2/24/89	.10 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
HIGH POTENTIAL EXPOSURE				
3/07/89	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
3/10/89	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l

ID: 1683

Date	Ra-226		Th-230	
8/25/88	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
9/01/88	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
BASELINE				
9/18/88	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
INCIDENT REPORT				
9/26/88	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
INCIDENT RESPONSE				
10/13/88	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l

Note: Bioassay result of 0 indicates < MDA

11/08/88	0.00 +/- .10 pCi/l	0.00 +/- .02 pCi/l
1/05/89	0.00 +/- .10 pCi/l	0.00 +/- .01 pCi/l
1/07/89	0.00 +/- .10 pCi/l	0.00 +/- .01 pCi/l
2/07/89	0.00 +/- .10 pCi/l	0.00 +/- .01 pCi/l
3/07/89	0.00 +/- .10 pCi/l	0.00 +/- .01 pCi/l
3/10/89	0.00 +/- .10 pCi/l	0.00 +/- .01 pCi/l

ID: 1774

Date	Ra-226	Th-230
8/25/88	.10 +/- .20 pCi/l	0.00 +/- .01 pCi/l
9/01/88	.10 +/- .20 pCi/l	0.00 +/- .01 pCi/l
BASELINE		
9/18/88	0.00 +/- .10 pCi/l	0.00 +/- .01 pCi/l
9/28/88	0.00 +/- .20 pCi/l	0.00 +/- .01 pCi/l
10/13/88	0.00 +/- .10 pCi/l	0.00 +/- .01 pCi/l
11/05/88	.10 +/- .20 pCi/l	0.00 +/- .01 pCi/l
HIGH POTENTIAL EXPOSURE		
12/12/88	.10 +/- .20 pCi/l	0.00 +/- .01 pCi/l
1/07/89	0.00 +/- .10 pCi/l	0.00 +/- .01 pCi/l
2/07/89	0.00 +/- .20 pCi/l	0.00 +/- .01 pCi/l
3/07/89	0.00 +/- .10 pCi/l	0.00 +/- .01 pCi/l
3/10/89	0.00 +/- .10 pCi/l	0.00 +/- .01 pCi/l

ID: 0985

Date	Ra-226	Th-230
8/25/88	.10 +/- .20 pCi/l	.02 +/- .01 pCi/l
9/01/88	.10 +/- .20 pCi/l	.02 +/- .01 pCi/l
BASELINE		
9/18/88	0.00 +/- .10 pCi/l	0.00 +/- .01 pCi/l
10/13/88	0.00 +/- .20 pCi/l	0.00 +/- .01 pCi/l
11/08/88	.10 +/- .20 pCi/l	0.00 +/- .01 pCi/l
12/12/88	0.00 +/- .10 pCi/l	0.00 +/- .01 pCi/l
1/07/89	.10 +/- .30 pCi/l	.01 +/- .01 pCi/l
2/07/89	0.00 +/- .20 pCi/l	0.00 +/- .01 pCi/l
3/07/89	0.00 +/- .40 pCi/l	0.00 +/- .01 pCi/l
3/10/89	0.00 +/- .40 pCi/l	0.00 +/- .01 pCi/l

ID: 4805

Date	Ra-226	Th-230
1/05/89	.10 +/- .30 pCi/l	0.00 +/- .01 pCi/l
BASELINE		
1/07/89	0.00 +/- .20 pCi/l	0.00 +/- .01 pCi/l
2/07/89	0.00 +/- .40 pCi/l	0.00 +/- .01 pCi/l
2/24/89	0.00 +/- .10 pCi/l	0.00 +/- .01 pCi/l
HIGH POTENTIAL EXPOSURE		
3/07/89	0.00 +/- .40 pCi/l	0.00 +/- .01 pCi/l
3/10/89	0.00 +/- .40 pCi/l	0.00 +/- .01 pCi/l

Note: Bioassay result of 0 indicates < MDA

ID: 5476

Date	Ra-226		Th-230	
8/25/88	.10 +/-	.20 pCi/l	.01 +/-	.01 pCi/l
9/01/88	.10 +/-	.20 pCi/l	.01 +/-	.01 pCi/l
BASELINE				
9/18/88	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
10/13/88	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
11/08/88	0.00 +/-	.20 pCi/l	0.00 +/-	.02 pCi/l
12/12/88	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
1/07/89	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
2/07/89	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
3/07/89	0.00 +/-	.30 pCi/l	0.00 +/-	.01 pCi/l
3/10/89	0.00 +/-	.30 pCi/l	0.00 +/-	.01 pCi/l

ID: 1206

Date	Ra-226		Th-230	
8/25/88	0.00 +/-	.30 pCi/l	0.00 +/-	.10 pCi/l
9/01/88	0.00 +/-	.30 pCi/l	0.00 +/-	.01 pCi/l
BASELINE				
9/18/88	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
10/13/88	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
11/08/88	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
12/12/88	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
1/07/89	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
2/07/89	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
3/07/89	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
3/10/89	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l

ID: 2473

Date	Ra-226		Th-230	
8/25/88	0.00 +/-	.20 pCi/l	.01 +/-	.01 pCi/l
9/01/88	0.00 +/-	.20 pCi/l	.01 +/-	.01 pCi/l
BASELINE				
9/18/88	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
10/13/88	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
11/08/88	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
12/12/88	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
1/07/89	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
2/07/89	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
3/07/89	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
3/10/89	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l

ID: 1974

Date	Ra-226		Th-230	
9/15/88	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
9/18/88	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
10/13/88	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
11/08/88	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
12/12/88	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
1/07/89	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l

Note: Bioassay result of 0 indicates < MDA

2/07/89	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
3/07/89	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
3/10/89	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l

ID: 2093

Date	Ra-226		Th-230	
8/25/88	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
9/01/88	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
BASELINE				
9/18/88	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
10/13/88	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
11/08/88	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
12/12/88	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
1/07/89	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
2/07/89	.20 +/-	.40 pCi/l	.01 +/-	.01 pCi/l
3/07/89	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
3/10/89	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l

ID:

Date	Ra-226		Th-230	
8/25/88	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l

ID: 4545

Date	Ra-226		Th-230	
8/25/88	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
9/01/88	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
BASELINE				
9/18/88	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
10/13/88	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
11/08/88	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
1/05/89	.20 +/-	.30 pCi/l	0.00 +/-	.01 pCi/l
1/07/89	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
2/07/89	.10 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
3/10/89	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l

ID: 1683

Date	Ra-226		Th-230	
8/25/88	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
9/01/88	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
BASELINE				
9/18/88	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
10/13/88	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
11/08/88	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
12/12/88	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
1/07/89	0.00 +/-	.10 pCi/l	.01 +/-	.01 pCi/l
2/07/89	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
3/07/89	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
3/10/89	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l

Note: Bioassay result of 0 indicates < MDA

ID: 2053

Date	Ra-226	Th-230
9/28/88	+/- pCi/l	.01 +/- .02 pCi/l
INSUFFICIENT SAMPLE FOR RA ANALYSIS		
10/13/88	0.00 +/- .20 pCi/l	0.00 +/- .01 pCi/l
11/08/88	0.00 +/- .20 pCi/l	.01 +/- .02 pCi/l
1/05/89	0.00 +/- .30 pCi/l	0.00 +/- .01 pCi/l
1/07/89	0.00 +/- .30 pCi/l	0.00 +/- .01 pCi/l
2/06/89	.10 +/- .50 pCi/l	.01 +/- .01 pCi/l
3/10/89	0.00 +/- .20 pCi/l	0.00 +/- .01 pCi/l

ID: 5152

Date	Ra-226	Th-230
8/25/88	0.00 +/- .20 pCi/l	0.00 +/- .01 pCi/l
9/01/88	0.00 +/- .20 pCi/l	0.00 +/- .01 pCi/l
BASELINE		
9/18/88	0.00 +/- .20 pCi/l	0.00 +/- .01 pCi/l
10/13/88	0.00 +/- .20 pCi/l	0.00 +/- .01 pCi/l
11/08/88	0.00 +/- .10 pCi/l	0.00 +/- .01 pCi/l
12/12/88	0.00 +/- .20 pCi/l	0.00 +/- .01 pCi/l
1/07/89	0.00 +/- .30 pCi/l	0.00 +/- .01 pCi/l
2/07/89	0.00 +/- .20 pCi/l	0.00 +/- .01 pCi/l
3/07/89	0.00 +/- .20 pCi/l	0.00 +/- .01 pCi/l
3/10/89	0.00 +/- .20 pCi/l	0.00 +/- .01 pCi/l

ID: 1406

Date	Ra-226	Th-230
9/18/88	0.00 +/- .10 pCi/l	0.00 +/- .01 pCi/l
BASELINE		
10/13/88	0.00 +/- .10 pCi/l	0.00 +/- .01 pCi/l
11/08/88	0.00 +/- .20 pCi/l	0.00 +/- .01 pCi/l
12/12/88	0.00 +/- .20 pCi/l	0.00 +/- .01 pCi/l
1/07/89	0.00 +/- .20 pCi/l	0.00 +/- .01 pCi/l
2/07/89	.10 +/- .20 pCi/l	0.00 +/- .01 pCi/l
3/07/89	0.00 +/- .10 pCi/l	0.00 +/- .01 pCi/l
3/10/89	0.00 +/- .10 pCi/l	0.00 +/- .01 pCi/l
9/15/88	0.00 +/- .10 pCi/l	0.00 +/- .01 pCi/l

ID: 2345

Date	Ra-226	Th-230
1/05/89	0.00 +/- .20 pCi/l	.10 +/- .10 pCi/l
CONTROL SAMPLE-BLANK		

ID: 3244

Date	Ra-226	Th-230
8/25/88	0.00 +/- .10 pCi/l	0.00 +/- .01 pCi/l
9/01/88	0.00 +/- .10 pCi/l	0.00 +/- .01 pCi/l
BASELINE		
9/18/88	.10 +/- .10 pCi/l	0.00 +/- .01 pCi/l
10/13/88	0.00 +/- .10 pCi/l	0.00 +/- .01 pCi/l

Note: Bioassay result of 0 indicates < MDA

11/08/88	0.00 +/- .20 pCi/l	0.00 +/- .01 pCi/l
1/05/89	0.00 +/- .20 pCi/l	0.00 +/- .01 pCi/l
1/07/89	0.00 +/- .20 pCi/l	0.00 +/- .01 pCi/l
2/07/89	.10 +/- .30 pCi/l	0.00 +/- .01 pCi/l
3/07/89	0.00 +/- .20 pCi/l	0.00 +/- .01 pCi/l
3/10/89	0.00 +/- .20 pCi/l	0.00 +/- .01 pCi/l

ID: 1774

Date	Ra-226	Th-230
8/25/88	.10 +/- .40 pCi/l	0.00 +/- .01 pCi/l
9/01/88	.10 +/- .40 pCi/l	0.00 +/- .01 pCi/l
BASELINE		
9/18/88	0.00 +/- .10 pCi/l	0.00 +/- .01 pCi/l
10/13/88	0.00 +/- .20 pCi/l	0.00 +/- .01 pCi/l
11/08/88	.20 +/- .20 pCi/l	.01 +/- .01 pCi/l
12/15/88	0.00 +/- 3.00 pCi/l	0.00 +/- 4.00 pCi/l
2/01/89	0.00 +/- .10 pCi/l	0.00 +/- .01 pCi/l

ID: 2063

Date	Ra-226	Th-230
8/25/88	0.00 +/- .20 pCi/l	0.00 +/- .01 pCi/l
9/01/88	0.00 +/- .20 pCi/l	0.00 +/- .01 pCi/l
BASELINE		
9/18/88	0.00 +/- .10 pCi/l	.01 +/- .01 pCi/l
10/13/88	0.00 +/- .20 pCi/l	0.00 +/- .01 pCi/l
11/08/88	0.00 +/- .20 pCi/l	0.00 +/- .01 pCi/l
12/12/88	0.00 +/- .10 pCi/l	0.00 +/- .01 pCi/l
1/07/89	0.00 +/- .30 pCi/l	0.00 +/- .01 pCi/l
2/07/89	0.00 +/- .20 pCi/l	0.00 +/- .01 pCi/l
3/07/89	0.00 +/- .20 pCi/l	0.00 +/- .01 pCi/l
3/10/89	0.00 +/- .20 pCi/l	0.00 +/- .01 pCi/l

ID: 1745

Date	Ra-226	Th-230
8/25/88	0.00 +/- .40 pCi/l	0.00 +/- .01 pCi/l
9/01/88	0.00 +/- .40 pCi/l	0.00 +/- .01 pCi/l
BASELINE		
9/28/88	0.00 +/- .20 pCi/l	0.00 +/- .01 pCi/l
10/13/88	0.00 +/- .20 pCi/l	0.00 +/- .01 pCi/l
11/08/88	.10 +/- .30 pCi/l	.01 +/- .02 pCi/l
1/05/89	.10 +/- .30 pCi/l	.01 +/- .02 pCi/l
1/07/89	0.00 +/- .20 pCi/l	0.00 +/- .01 pCi/l
2/06/89	0.00 +/- .40 pCi/l	0.00 +/- .01 pCi/l
3/07/89	0.00 +/- .40 pCi/l	.01 +/- .01 pCi/l
3/10/89	0.00 +/- .40 pCi/l	.01 +/- .01 pCi/l

ID: 3734

Date	Ra-226	Th-230
8/25/88	0.00 +/- .20 pCi/l	0.00 +/- .01 pCi/l

Note: Bioassay result of 0 indicates < MDA

9/01/88	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
BASELINE				
9/18/88	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
10/13/88	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
11/08/88	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
12/12/88	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
1/07/89	0.00 +/-	.30 pCi/l	0.00 +/-	.01 pCi/l
2/07/89	0.00 +/-	.10 pCi/l	.01 +/-	.01 pCi/l
3/07/89	0.00 +/-	.10 pCi/l	.03 +/-	.01 pCi/l
INSUFFICIENT VOLUME FOR REANALYSIS				
3/10/89	0.00 +/-	.10 pCi/l	.03 +/-	.01 pCi/l
INSUFFICIENT SAMPLE FOR REANALYSIS				

ID: 2312

Date	Ra-226		Th-230	
9/18/88	0.00 +/-	.80 pCi/l	0.00 +/-	.01 pCi/l
BASELINE				
10/13/88	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
11/08/88	.10 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
12/12/88	.10 +/-	.30 pCi/l	0.00 +/-	.01 pCi/l
1/07/89	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
2/07/89	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
3/07/89	0.00 +/-	.40 pCi/l	.01 +/-	.01 pCi/l
3/10/89	0.00 +/-	.40 pCi/l	.01 +/-	.01 pCi/l

ID: 1824

Date	Ra-226		Th-230	
8/25/88	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
9/01/88	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
BASELINE				
9/18/88	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
10/13/88	0.00 +/-	.30 pCi/l	0.00 +/-	.01 pCi/l
11/08/88	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
12/12/88	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
1/07/89	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
2/07/89	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
3/07/89	0.00 +/-	.10 pCi/l	.01 +/-	.01 pCi/l
3/10/89	0.00 +/-	.10 pCi/l	.01 +/-	.01 pCi/l

ID: 5241

Date	Ra-226		Th-230	
9/01/88	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
BASELINE				
9/18/88	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
10/13/88	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
11/08/88	.10 +/-	.20 pCi/l	.01 +/-	.01 pCi/l
1/05/89	0.00 +/-	.30 pCi/l	0.00 +/-	.01 pCi/l
1/07/89	0.00 +/-	.30 pCi/l	0.00 +/-	.01 pCi/l
2/07/89	.10 +/-	.30 pCi/l	0.00 +/-	.01 pCi/l
3/07/89	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l

Note: Bioassay result of 0 indicates < MDA

3/10/89	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l

ID: 5241

Date	Ra-226		Th-230	
8/25/88	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l

ID: 1626

Date	Ra-226		Th-230	
1/07/89	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
2/07/89	.10 +/-	.20 pCi/l	.01 +/-	.01 pCi/l
2/14/89	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
DETECTED SMEARABLE IN RESPIRATOR				
3/07/89	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
3/10/89	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l

ID: 4356

Date	Ra-226		Th-230	
8/25/88	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
9/01/88	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
BASELINE				
9/18/88	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
10/13/88	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
11/08/88	0.00 +/-	.10 pCi/l	.01 +/-	.01 pCi/l
12/12/88	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
1/07/89	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
2/07/89	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
3/07/89	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
3/10/89	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l

ID: 1944

Date	Ra-226		Th-230	
9/01/88	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
BASELINE				
9/18/88	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
10/13/88	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
11/08/88	.10 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
12/12/88	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
1/07/89	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
3/07/89	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
3/10/89	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
8/25/88	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l

ID: 1674

Date	Ra-226		Th-230	
8/25/88	+/-	pCi/l	0.00 +/-	.01 pCi/l

ID: 0775

Date	Ra-226		Th-230	
8/25/88	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l

Note: Bioassay result of 0 indicates < MDA

ID: 0775

Date	Ra-226		Th-230	
9/01/88	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
BASELINE				
9/18/88	0.00 +/-	.10 pCi/l	0.00 +/-	.01 pCi/l
10/13/88	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
11/08/88	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
12/12/88	.10 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
1/07/89	.10 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
2/07/89	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
2/14/89	0.00 +/-	.10 pCi/l	.01 +/-	.02 pCi/l
DETECTED SMEARABLE IN RESPIRATOR				
3/07/89	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l
3/10/89	0.00 +/-	.20 pCi/l	0.00 +/-	.01 pCi/l

Note: Bioassay result of 0 indicates < MDA

APPENDIX 1-B

DOSIMETRY RESULTS

DOSIMETRY RESULTS
MONTHLY RESULTS SUMMARIZED BY QUARTER

ID	Q3 '88 Deep	Q3 '8 Shallow	Q4 '88 Deep	Q4 '88 Shallow	Q1 '89 Deep	Q1 '89 Shallow	Q2 '89 Deep	Q2 '89 Shallow
1905	0	0	0	0	0	0	0	0
1913	0		0					
3155	0	0	0	0	0	0	0	0
1815	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0
1133	0	0	0	0	0	0	0	0
1655	0		0					
2043	0		0					
1683	0		0					
1774	0	0	0	0	0	0	0	0
0985	0	0	0	0	0	0	0	0
4805	0	0	0	0	0	0	0	0
2508	0	0	0	0	0	0	0	0
5476	0		0					
1206	0	0	0	0	0	0	0	0
2473	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0
2093	0	0	0	0	0	0	0	0
4738	0	0	0	0	0	0	0	0
4545	0	0	0	0	0	0	0	0
1683	0		0					
5152	0	0	0	0	0	0	0	0
3244	0	0	0	0	0	0	0	0
1774	0	0	0	0	0	0	0	0
2063	0	0	0	0	0	0	0	0
1745	0	0	0	0	0	0	0	0
3734	0	0	0	0	0	0	0	0
2312	0	0	0	0	0	0	0	0
1824	0	0	0	0	0	0	0	0
5241	0	0	0	0	0	0	0	0
1626	0		0					
1646	0		0					
4356	0	0	0	0	0	0	0	0
2092	0	0	0	0	0	0	0	0
1944	0	0	0	0	0	0	0	0
0775	0	0	0	0	0	0	0	0

Q=quarter, 0<=MDA (approximately 10 mrem), Deep=whole body, Shallow=skin dose

LANSDOWNE RADIOACTIVE RESIDENCE COMPLEX

DISMANTLEMENT / REMOVAL PROJECT

DOSIMETER INVESTIGATION REPORT

Name: Fello

Date: 05/22/89

Social Security No. 0819

Site: Lansdowne

Job Class: Laborer

Type: Beta-Gamma Film Badge or TLD

Period Covered:
From 04/01/89 To 04/30/89

Reason for Dosimeter Investigation:
Monthly TLD results showed 220 millirem dose received.

RADIATION MONITORING ESTIMATE OF DOSE DURING PERIOD

Available Dosimeter Results During Period:

The following are TLD results of work performed in the same work area: Randy Fello 220-millirem; William Hazlet 0-millirem; Michael Zigo 0-millirem; Shawn Heffernan 0-millirem.

Methods used for estimating Dose:

Randy J. Fello was personally interviewed on this matter. Mr. Fello stated that his TLD had not been removed from the project site, nor did he receive medical or dental X-Rays during this time period. Additionally, acquired from Mr. Fello was a confirmation of the names of the personnel also associated with the work operations during the period of time in question. A review of the relevant personnel dose results indicate a null dose was received.(i.e. The TLD results show 0 millirem). Receiving a one month dose of this magnitude in this particular work area would require a dose rate of at least 1000 micro-roentgen per hour. A review of the gamma survey results performed in this area, the highest exposure rates encountered were typically less than 70 micro-roentgen per hour. Although contact readings of point sources show levels of 100 to 265 micro-roentgen per hour, inside the portions of the sewer pipe itself which was being removed. It

is highly improbable a worker could be in contact with these point sources for a duration sufficient to acquire the dose recorded of 220 millirem. Finally, the vendor, Eberline TMA, responsible for analysis was contacted. The vendor indicated the recorded dose was a valid one and that nothing untoward had been done to the TLD.

A review of all TLDs submitted during the period in question, found a TLD which had been exposed to an X-ray dose. This TLD was issued to Mr. K. Goodwin. It may be possible the vendor has some confusion between the TLDs issued one of which was issued to Mr. Fello and the other issued to Mr. Kenneth Goodwin. A review of the response check data for the instrumentation used on-site shows them to be continuously operative during the period in question. It is unlikely the surveys performed were done using inaccurate instrumentation.

Supplementary Exposure Data:

Estimated Dose: It is recommend a flag be placed on Mr. Fello's file regarding this investigation, or the dose as applied to S. Heffernan, W. Hazlet, and M. Zigo of 0 millirem be applied to Mr. Fello.

APPENDIX 1-C

WHOLE-BODY COUNT RESULTS

PRE - REMEDIAL

(BASELINE)

BENSON, SHANEL 08/04/88 AT 1724

POTASSIUM,	NCI = 86. + OR - 11.	G/KG =	0.9
RADIUM-226,	NCI = 0. + OR - 3.		
TOTALS		% MPBB =	0.0

BOWSER, ROBERT 08/03/88 AT 1829

POTASSIUM,	NCI = 99. + OR - 9.	G/KG =	1.4
RADIUM-226,	NCI = 0. + OR - 3.		
TOTALS		% MPBB =	0.0

CAFOURAS, MARK A 08/02/88 AT 1004

POTASSIUM,	NCI = 114. + OR - 10.	G/KG =	1.8
RADIUM-226,	NCI = 0. + OR - 3.		
TOTALS		% MPBB =	0.0

CAROLLO, CRYSTAL M 08/04/88 AT 1640

POTASSIUM,	NCI = 69. + OR - 10.	G/KG =	1.0
RADIUM-226,	NCI = 0. + OR - 3.		
TOTALS		% MPBB =	0.0

ELWOOD, THOMAS 08/03/88 AT 1421

POTASSIUM,	NCI = 109. + OR - 25.	G/KG =	1.5
RADIUM-226,	NCI = 0. + OR - 7.		
TOTALS		% MPBB =	0.0

FELLO, RANDY 08/04/88 AT 1807

POTASSIUM,	NCI = 89. + OR - 10.	G/KG =	1.5
RADIUM-226,	NCI = 0. + OR - 3.		
TOTALS		% MPBB =	0.0

FOX, ELDIWAINE 08/02/88 AT 1603

POTASSIUM,	NCI = 114. + OR - 12.	G/KG =	1.3
RADIUM-226,	NCI = 0. + OR - 3.		
TOTALS		% MPBB =	0.0

PRE - REMEDIAL

(BASELINE)

GOODWIN, KENNETH, P 08/02/88 AT 1645

POTASSIUM,	NCI = 101. + OR - 12.	G/KG =	1.2
RADIUM-226,	NCI = 0. + OR - 3.		
TOTALS		% MPBB =	0.0

HAZLETT, WILLIAM 08/05/88 AT 1005

POTASSIUM,	NCI = 134. + OR - 14.	G/KG =	1.6
RADIUM-226,	NCI = 0. + OR - 3.		
TOTALS		% MPBB =	0.0

HEFFERNAN, SHAWN M 08/02/88 AT 1223

POTASSIUM,	NCI = 105. + OR - 10.	G/KG =	1.6
RADIUM-226,	NCI = 0. + OR - 3.		
TOTALS		% MPBB =	0.0

HUSTON, RAYMOND L 08/02/88 AT 1307

POTASSIUM,	NCI = 116. + OR - 12.	G/KG =	1.5
RADIUM-226,	NCI = 0. + OR - 3.		
TOTALS		% MPBB =	0.0

JANOSIK, VICTOR 08/02/88 AT 1518

POTASSIUM,	NCI = 152. + OR - 12.	G/KG =	1.9
RADIUM-226,	NCI = 0. + OR - 3.		
TOTALS		% MPBB =	0.0

JESKE, WILLIAM 08/05/88 AT 1128

POTASSIUM,	NCI = 120. + OR - 13.	G/KG =	1.7
RADIUM-226,	NCI = 0. + OR - 3.		
TOTALS		% MPBB =	0.0

JOHNSON, SHARON 08/02/88 AT 0923

POTASSIUM,	NCI = 80. + OR - 9.	G/KG =	1.8
RADIUM-226,	NCI = 0. + OR - 3.		
TOTALS		% MPBB =	0.0

PRE - REMEDIAL

(BASELINE)

LIVENGOOD, DICK E 08/04/88 AT 1850

POTASSIUM,	NCI = 93. + OR - 10.	G/KG =	1.5
RADIUM-226,	NCI = 0. + OR - 3.		
TOTALS		% MPBB =	0.0

MOJICA, TOM 08/02/88 AT 1139

POTASSIUM,	NCI = 95. + OR - 11.	G/KG =	1.6
RADIUM-226,	NCI = 0. + OR - 3.		
TOTALS		% MPBB =	0.0

PEEL, FRANK 08/03/88 AT 1714

POTASSIUM,	NCI = 94. + OR - 11.	G/KG =	1.3
RADIUM-226,	NCI = 0. + OR - 3.		
TOTALS		% MPBB =	0.0

RIGBY, WILLIAM II 08/02/88 AT 1435

POTASSIUM,	NCI = 117. + OR - 10.	G/KG =	1.7
CESIUM-137,	NCI = 2. + OR - 1.	% MPBB =	0.0
RADIUM-226,	NCI = 0. + OR - 3.		
TOTALS		% MPBB =	0.0

SCHWARTZ, THOMAS 08/03/88 AT 0937

POTASSIUM,	NCI = 78. + OR - 9.	G/KG =	1.5
RADIUM-226,	NCI = 0. + OR - 3.		
TOTALS		% MPBB =	0.0

SEITZ, WILLIAM 08/05/88 AT 1217

POTASSIUM,	NCI = 94. + OR - 13.	G/KG =	0.9
RADIUM-226,	NCI = 0. + OR - 3.		
TOTALS		% MPBB =	0.0

SITASZ, KATHLEEN, P 08/04/88 AT 0753

POTASSIUM,	NCI = 34. + OR - 10.	G/KG =	0.8
RADIUM-226,	NCI = 0. + OR - 3.		
TOTALS		% MPBB =	0.0

PRE - REMEDIAL

(BASELINE)

SOYAK, JOHN		08/05/88 AT 1353
POTASSIUM,	NCI = 89. + OR - 17.	G/KG = 1.3
RADIUM-226,	NCI = 0. + OR - 4.	
TOTALS		% MPBB = 0.0

STANLEY, NADINE		08/04/88 AT 1556
POTASSIUM,	NCI = 75. + OR - 10.	G/KG = 1.5
RADIUM-226,	NCI = 0. + OR - 3.	
TOTALS		% MPBB = 0.0

STANTON, MICHAEL		08/05/88 AT 1041
POTASSIUM,	NCI = 108. + OR - 10.	G/KG = 1.6
RADIUM-226,	NCI = 0. + OR - 3.	
TOTALS		% MPBB = 0.0

TRUJILLO, PETER IV		08/05/88 AT 1449
POTASSIUM,	NCI = 104. + OR - 18.	G/KG = 1.4
RADIUM-226,	NCI = 0. + OR - 4.	
TOTALS		% MPBB = 0.0

WALKER, WAYMAN		08/03/88 AT 1226
POTASSIUM,	NCI = 91. + OR - 12.	G/KG = 1.5
RADIUM-226,	NCI = 0. + OR - 3.	
TOTALS		% MPBB = 0.0

WICKBOLD, WALTER		08/03/88 AT 0801
POTASSIUM,	NCI = 105. + OR - 8.	G/KG = 1.4
CESIUM-137,	NCI = 1. + OR - 1.	% MPBB = 0.0
RADIUM-226,	NCI = 0. + OR - 3.	
TOTALS		% MPBB = 0.0

WRIGHT, GERALD		08/03/88 AT 1143
POTASSIUM,	NCI = 110. + OR - 11.	G/KG = 1.9
RADIUM-226,	NCI = 0. + OR - 3.	
TOTALS		% MPBB = 0.0

PRE - REMEDIAL

(BASELINE)

ZARNOSKI, ALFRED J JR 08/02/88 AT 1046

POTASSIUM,	NCI = 116. + OR - 10.	G/KG = 1.7
RADIUM-226,	NCI = 0. + OR - 3.	
TOTALS		% MPBB = 0.0

ZIGO, MICHAEL R 08/02/88 AT 0824

POTASSIUM,	NCI = 96. + OR - 10.	G/KG = 1.4
RADIUM-226,	NCI = 0. + OR - 3.	
TOTALS		% MPBB = 0.0

'PRE - REMEDIAL

(BASELINE)

		NATURAL THORIUM MILLIGRAMS
BENSON, SHANEL I	08/09/88 AT 1743	0 ± 3
BOWSER, ROBERT K	08/08/88 AT 1929	0 ± 3
CAFOURAS, MARK A	08/05/88 AT 1808	0 ± 4
ELWOOD, THOMAS E	08/06/88 AT 1321	0 ± 3
FELLO, RANDY J	08/08/88 AT 1655	0 ± 3
FOX, ELDIWAINE W	08/09/88 AT 0913	0 ± 4
GOODWIN, KEN P	08/08/88 AT 1524	0 ± 3
HAZLETT, WILLIAM C	08/06/88 AT 0754	0 ± 3
HEFFERNAN, SHAWN M	08/09/88 AT 0802	0 ± 3
HUSTON, RAY L	08/06/88 AT 1216	0 ± 3
JANOSIK, VICTOR J	08/05/88 AT 1632	0 ± 3
JESKE, WILLIAM	08/06/88 AT 1705	0 ± 3
JOHNSON, SHARON V	08/08/88 AT 1609	0 ± 3
LIVENGOOD, DICK E	08/06/88 AT 0956	0 ± 3
MOJICA, TOM	08/08/88 AT 1347	0 ± 3
NAMETH, ROBERT E	08/06/88 AT 0913	0 ± 3
PEELE, FRANK	08/08/88 AT 1217	0 ± 3
RIGBY, WILLIAM M	08/08/88 AT 1438	0 ± 3
SCHWARTZ, THOMAS V	08/08/88 AT 1824	0 ± 3
SEITZ, WILLIAM H	08/09/88 AT 1028	0 ± 3
SITASZ, KATHLEEN P	08/05/88 AT 1725	0 ± 3
SOYAK, JOHN A	08/06/88 AT 1407	0 ± 3
STANLEY, NADINE O	08/09/88 AT 1606	0 ± 3
STANTON, MICHAEL F	08/06/88 AT 1041	0 ± 3
TRUJILLO, PETE A	08/06/88 AT 1526	0 ± 3
WICKBOLDT, WALTER C	08/08/88 AT 1044	0 ± 4
WRIGHT, GERALD W	03/08/88 AT 1302	0 ± 4
ZIGO, MICHAEL R	08/06/88 AT 1613	0 ± 3

POST-REMEDIAL
(FINAL)

AUSTIN, ROBERT 05/13/89 AT 0831
JOB ID = COE

RADIUM-226, NCI = 0. + OR - 3.
05/13/89 AT 1314
NATURAL THORIUM, MG = 0. + OR - 3.

BENSON, SHAREL 05/11/89 AT 1843
JOB ID = SECURITY

RADIUM-226, NCI = 0. + OR - 3.
05/12/89 AT 1557
NATURAL THORIUM, MG = 0. + OR - 3.

BOWDEN, DANIEL 05/13/89 AT 0747
JOB ID = COE

RADIUM-226, NCI = 0. + OR - 3.
05/13/89 AT 1230
NATURAL THORIUM, MG = 0. + OR - 3.

BOWSER, ROBERT 05/11/89 AT 1729
JOB ID = EQ OPR

RADIUM-226, NCI = 0. + OR - 3.
05/09/89 AT 1722
NATURAL THORIUM, MG = 0. + OR - 3.

CAFOURAS, MARK 05/10/89 AT 1916
JOB ID = RCT

RADIUM-226, NCI = 0. + OR - 3.
05/09/89 AT 1811
NATURAL THORIUM, MG = 0. + OR - 3.

POST-REMEDIAL
(FINAL)

COX, EDWARD 05/10/89 AT 1653
JOB ID = COE

RADIUM-226, NCI = 0. + OR - 3.
05/10/89 AT 1152
NATURAL THORIUM, MG = 0. + OR - 3.

FELLO, RANDY 05/10/89 AT 1827
JOB ID = LABORER

RADIUM-226, NCI = 0. + OR - 3.
05/09/89 AT 1858
NATURAL THORIUM, MG = 0. + OR - 3.

FOX, BUCK 05/11/89 AT 1416
JOB ID = EQ ORP

RADIUM-226, NCI = 0. + OR - 3.
05/10/89 AT 0701
NATURAL THORIUM, MG = 0. + OR - 3.

FUNT, BRADFORD 05/10/89 AT 1430
JOB ID = COE

RADIUM-226, NCI = 0. + OR - 3.
05/10/89 AT 1103
NATURAL THORIUM, MG = 0. + OR - 3.

GOODWIN, KENNETH P 05/08/89 AT 1554
JOB ID = TRUCK DRIVER

RADIUM-226, NCI = 0. + OR - 3.
05/09/89 AT 1106
NATURAL THORIUM, MG = 0. + OR - 3.

POST-REMEDIAL
(FINAL)

HAZLETT, WILLIAM   05/11/89 AT 1505
      JOB ID = LABORER

RADIUM-226,   NCI =   0. + OR - 3.
                                                    05/10/89 AT 0744
NATURAL THORIUM,   MG =   0. + OR - 3.

HEFFERNAN, SHAWN   05/11/89 AT 1552
      JOB ID = RAD CON

RADIUM-226,   NCI =   0. + OR - 3.
                                                    05/10/89 AT 0831
NATURAL THORIUM,   MG =   0. + OR - 3.

HOWIE, LARRY D   05/08/89 AT 1643
      JOB ID = RAD CON

RADIUM-226,   NCI =   0. + OR - 3.
                                                    05/09/89 AT 1151
NATURAL THORIUM,   MG =   0. + OR - 3.

HUSTON, RA   05/11/89 AT 1639
      JOB ID = PROJECT MGR

RADIUM-226,   NCI =   0. + OR - 3.
                                                    05/12/89 AT 0842
NATURAL THORIUM,   MG =   0. + OR - 3.

JANOSIK, VICTOR   05/10/89 AT 1604
      JOB ID = EPA

RADIUM-226,   NCI =   0. + OR - 3.
                                                    05/10/89 AT 0915
NATURAL THORIUM,   MG =   0. + OR - 3.

POST-REMEDIAL
(FINAL)

JESKE, WILLIAM 05/08/89 AT 1729
JOB ID = RAD CON

RADIUM-226, NCI = 0. + OR - 3.
05/09/89 AT 1236
NATURAL THORIUM, MG = 0. + OR - 3.

JOHNSON, SHARON 05/12/89 AT 1844
JOB ID = CNSI

RADIUM-226, NCI = 0. + OR - 3.
05/12/89 AT 0753
NATURAL THORIUM, MG = 0. + OR - 3.

KRINER, WILLIAM 05/13/89 AT 0659
JOB ID = COE

RADIUM-226, NCI = 0. + OR - 3.
05/13/89 AT 1143
NATURAL THORIUM, MG = 0. + OR - 3.

LEON, MIKE 05/11/89 AT 0702
JOB ID = GUARD

RADIUM-226, NCI = 0. + OR - 3.
05/12/89 AT 0701
NATURAL THORIUM, MG = 0. + OR - 3.

LIVENGOOD, RICHARD 05/08/89 AT 1818
JOB ID = LABOR

RADIUM-226, NCI = 0. + OR - 3.
05/09/89 AT 1331
NATURAL THORIUM, MG = 0. + OR - 3.

MOJICA, TOM 05/09/89 AT 0922
JOB ID = RAD CON

RADIUM-226, NCI = 0. + OR - 3.
05/09/89 AT 1636
NATURAL THORIUM, MG = 0. + OR - 3.

MOORE, JAMES P 05/10/89 AT 1515
JOB ID = COE

RADIUM-226, NCI = 0. + OR - 3.
05/10/89 AT 1243
NATURAL THORIUM, MG = 0. + OR - 3.

NAMETH, ROBERT 05/12/89 AT 1755
JOB ID = CARLUCCI

RADIUM-226, NCI = 0. + OR - 3.
05/12/89 AT 1240
NATURAL THORIUM, MG = 0. + OR - 3.

PEEL, FRANK 05/11/89 AT 0921
JOB ID = OPS SUPV

RADIUM-226, NCI = 0. + OR - 3.
COBALT-60, NCI = 2. + OR - 1. % MPBB = 0.1
TOTALS % MPBB = 0.1

05/12/89 AT 1100
NATURAL THORIUM, MG = 0. + OR - 3.

RIGBY, WILLIAM 05/11/89 AT 1009
JOB ID = RCT

RADIUM-226, NCI = 0. + OR - 3.
05/12/89 AT 1329
NATURAL THORIUM, MG = 0. + OR - 3.

WRIGHT, GERALD 05/11/89 AT 0836
JOB ID = SECURITY

RADIUM-226, NCI = 0. + OR - 3.
05/12/89 AT 1014
NATURAL THORIUM, MG = 0. + OR - 3.

ZARUOSKI, ALFRED JR 05/13/89 AT 0917
JOB ID = COE

RADIUM-226, NCI = 0. + OR - 3.
05/13/89 AT 1100
NATURAL THORIUM, MG = 0. + OR - 3.

ZIGO, MICHAEL 05/11/89 AT 0750
JOB ID = RCT

RADIUM-226, NCI = 0. + OR - 3.
05/12/89 AT 1504
NATURAL THORIUM, MG = 0. + OR - 3.

POST-REMEDIAL
(FINAL)

SEITZ, WILLIAM 05/11/89 AT 1142
JOB ID = CARLUCCI

RADIUM-226, NCI = 0. + OR - 3.
05/12/89 AT 0926
NATURAL THORIUM, MG = 0. + OR - 3.

SEITZ, WILLIAM E 04/25/89 AT 0848
JOB ID = OPER

RADIUM-226, NCI = 0. + OR - 3.
04/25/89 AT 1120
NATURAL THORIUM, MG = 0. + OR - 3.

SITASZ, KATHLEEN 05/11/89 AT 1053
JOB ID = EMT

RADIUM-226, NCI = 0. + OR - 3.
05/12/89 AT 1154
NATURAL THORIUM, MG = 0. + OR - 3.

SOYAK, JOHN 05/11/89 AT 1233
JOB ID = E S

RADIUM-226, NCI = 0. + OR - 3.
05/12/89 AT 1417
NATURAL THORIUM, MG = 0. + OR - 3.

STANLEY, NADINE 05/10/89 AT 1738
JOB ID = COE

RADIUM-226, NCI = 0. + OR - 3.
05/09/89 AT 1956
NATURAL THORIUM, MG = 0. + OR - 3.

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STANTON, MICHAEL                                    05/09/89 AT 0701
      JOB ID =  LABORER

RADIUM-226,          NCI =    0. + OR -   3.
                                                    05/09/89 AT 1419
NATURAL THORIUM,     MG  =    0. + OR -   3.


TRUJILLO, PETER                                     05/09/89 AT 0836
      JOB ID =  H P

RADIUM-226,          NCI =    0. + OR -   3.
                                                    05/09/89 AT 1551
NATURAL THORIUM,     MG  =    0. + OR -   3.


UTISS, MARSHALL                                     05/09/89 AT 0748
      JOB ID =  LABORER

RADIUM-226,          NCI =    0. + OR -   3.
                                                    05/09/89 AT 1506
NATURAL THORIUM,     MG  =    0. + OR -   3.


WICHBOLDT, WALTER                                   05/11/89 AT 1331
      JOB ID =  ACE

RADIUM-226,          NCI =    0. + OR -   3.
                                                    05/10/89 AT 1003
NATURAL THORIUM,     MG  =    0. + OR -   3.


WILSON, WILLIAM H                                   04/25/89 AT 0945
      JOB ID =  DRILL RIG

RADIUM-226,          NCI =    0. + OR -   3.
                                                    04/25/89 AT 1202
NATURAL THORIUM,     MG  =    0. + OR -   3.
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LANSDOWNE

RADIOACTIVE RESIDENCE COMPLEX
DISMANTLEMENT/REMOVAL PROJECT

RADIOLOGICAL CLOSEOUT REPORT

CHEM-NUCLEAR SYSTEMS, INC.
220 STONERIDGE DRIVE
COLUMBIA, SOUTH CAROLINA

CHAPTER 2
NON-RADIOLOGICALLY CONTROLLED ZONE SURVEYS

CLOSEOUT REPORT

SURVEYS OUTSIDE RADIOLOGICALLY CONTROLLED ZONES

TABLE OF CONTENTS

LIST OF MAPS

1.0 INTRODUCTION

During the period of August 1, 1988 to May 19, 1988 monitoring programs were established to insure that radiological contamination was controlled. The monitoring programs also insured that any contamination which did occur outside controlled zones was quickly detected and removed. This was accomplished by routinely surveying all work areas both inside and outside the controlled zones, by surveying all tools and equipment prior to their removal from the radiologically controlled zone, by controlling access to potentially contaminated areas, surveying personnel prior to their exit from controlled zones, and monitoring the discharge of water used to launder contaminated clothing. The following sections of this document present descriptions and summaries of the surveys performed during this time period.

2.0 GENERAL

In accordance with the Safety, Health and Emergency Response Plan (SHERP) and the Contractor's Quality Control Plan, both swipe and direct reading (total contamination) surveys (routine and unrestricted release) were performed. As indicated in the SHERP, limits for unrestricted release were taken from USAEC Regulatory Guide 1.86, "Termination of Operating Licenses for Nuclear Reactors", Table I. These limits are 100, 300, and 20 dpm/100 cm2 for average, maximum, and removable alpha contamination, respectively. Additionally, in accordance with the Spill Control Plan and a protocol developed on-site, water analysis was performed. Water found to be below the release criteria was discharged into the sanitary sewer.

3.0 ROUTINE SURVEYS

Routine swipe surveys for loose contamination were performed in non-radiologically controlled zones associated with the project site, such as administrative areas, at a minimum of once each week. These surveys were also sometimes performed on a twice-weekly and/or twice-daily basis, depending on the level of traffic through the area and the work activities taking place in the adjacent radiologically controlled zone. These surveys focused on areas where there was an increased potential for contamination, such as the crew trailer, on-site laboratory, and the operational support facility. The swipes collected from the survey were counted using a scaler and detector assembly such as the Eberline MS-2 or Ludlum 2000 scaler and Ludlum 43-10 alpha scintillation detector. Locations with survey results above the limits for unrestricted areas were decontaminated.

In addition to the routine swipe surveys, direct reading surveys were also performed in the various locations in the administrative area. These surveys were performed in conjunction with the swipe surveys. Direct reading (total contamination) surveys were performed with a portable instrument such as the Eberline RM-20 and Eberline HP-210T, or

the Eberline PAC-4-G3 and Eberline AC-21b detector assembly. A direct reading survey was performed by slowly moving the detector parallel to and within one inch of an object's surface. A contact reading was made at the location with the highest result, based on the initial scan. The contact value observed was then recorded and converted to disintegrations per minute.

Appendix D of this document provides a summary of the direct and swipe surveys which were performed throughout the remedial action phase of the project, as well as maps showing the layout of the trailers.

4.0 UNRESTRICTED RELEASE SURVEYS

All equipment and tools which entered the radiologically controlled zone were surveyed prior to removal from the project site. Typically these surveys were performed at a contamination reduction zone to insure that loose surface contamination did not spread into a non-radiologically controlled zone. Both direct and swipe surveys were done on each tool or piece of equipment prior to release.

The swipes collected for a survey were initially counted using a portable geiger-mueller type instrument such as an Eberline RM-20, with an Eberline HP-210T detector assembly. This was done to provide a cursory check of the level of contamination. Final verification of compliance with United States Atomic Energy Commission Guideline 1.86 was accomplished by recounting the collected swipes utilizing a more sensitive scaler and detector assembly such as the Eberline MS-2 or Ludlum 2000.

Direct reading surveys were performed with portable instruments such as the Eberline RM-20 and Eberline HP-210T or the Eberline PAC-4-G3 and Eberline AC-21b detector assembly. A direct reading survey was performed as previously discussed in Section 3.0. Appendix E of this document presents a summary of the unrestricted release surveys performed.

5.0 WATER RELEASE SURVEYS

Throughout the course of the remedial action phase of the project, radiation workers performing job tasks in the radiologically controlled zone(s) were as a minimum required to wear a work uniform of cloth coveralls. These coveralls were machine laundered daily. The waste water from this process was collected within a container until it was full. The water within the container was then agitated and sampled. Typically, a one liter sample was collected and the sample was volume reduced to 100 milliliters. A one milliliter aliquot was evaporated on an aluminum planchet. The planchet was then counted for alpha activity on the Ludlum 2000. To be conservative, all observed activity was considered to be from Radium-226. The release criteria as specified in Title 10 of the Code of Federal Regulations, Part 20 for release of Radium-226 into a sanitary sewer is 4.0×10^{-7} micro-curies per

milliliter, and is the most restrictive of the four radionuclides of concern at the project site. If a sample was found to be above the criteria, the water was recirculated through a 10 micron filter, then resampled and counted. This process was repeated until such time as the water was found to be below the release criteria. Appendix F contains the water analysis data sets.

APPENDIX 2-A

ADMINISTRATIVE AREA SURVEYS

ADMINISTRATIVE AREA SURVEYS

GENERAL

The following is a summary of the routine swipe surveys performed in the administrative area. To view the data in a tabular form, certain abbreviations were used. Below is a key to define those abbreviations.

DATE	LOCATION	MIN.	MAX.	# READINGS
Sep 20, 1988	Crew trailer	* (B)	2.3 (B)	10D

Direct

Beta-gamma measurement

value in DPM

No detectable activity

DATE	LOCATION	MIN.	MAX.	# READINGS
Sep 20, 1988	Crew trailer	* (A)	* (A)	(10)S

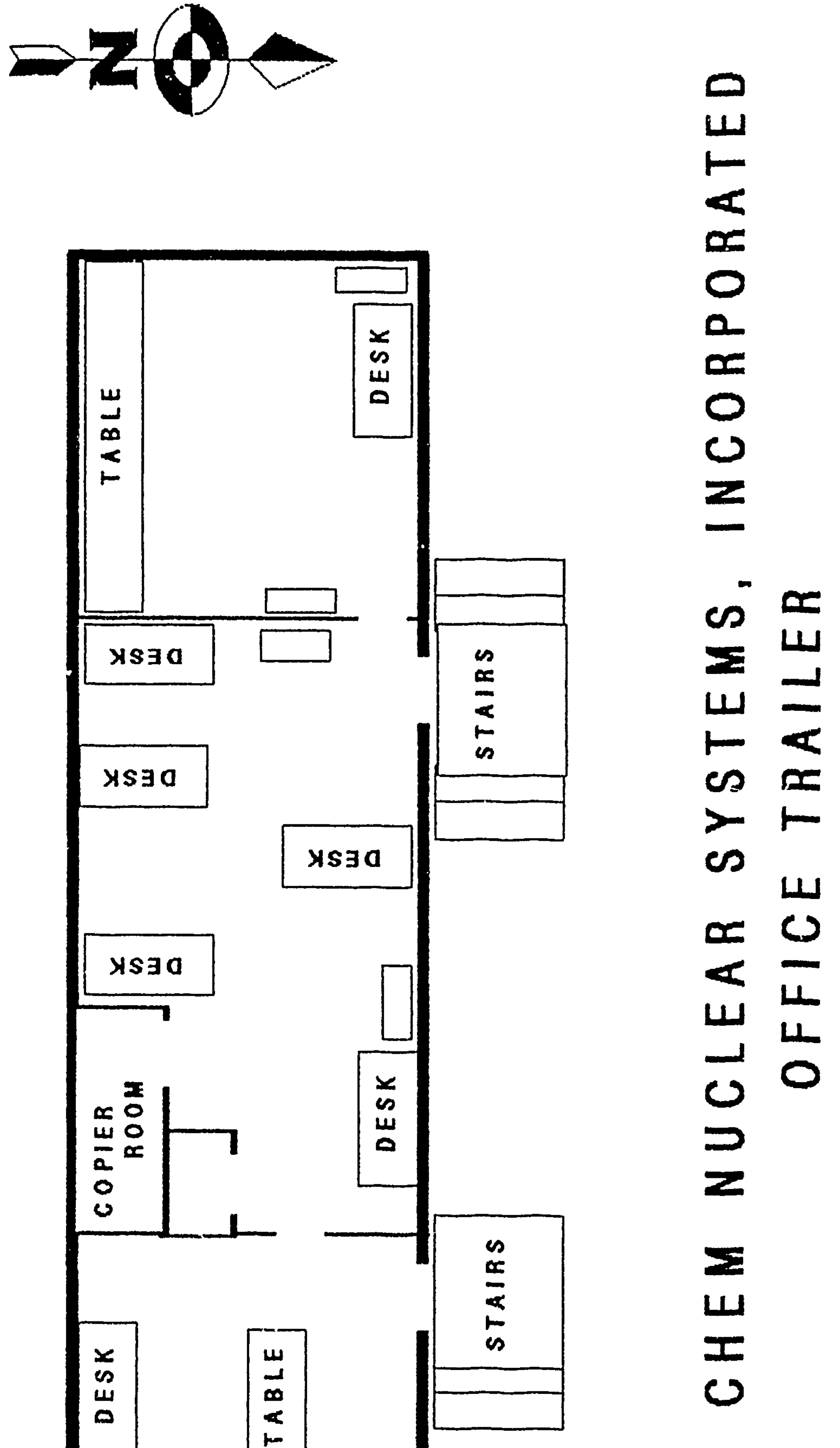
Swipe

Alpha measurement

No detectable activity

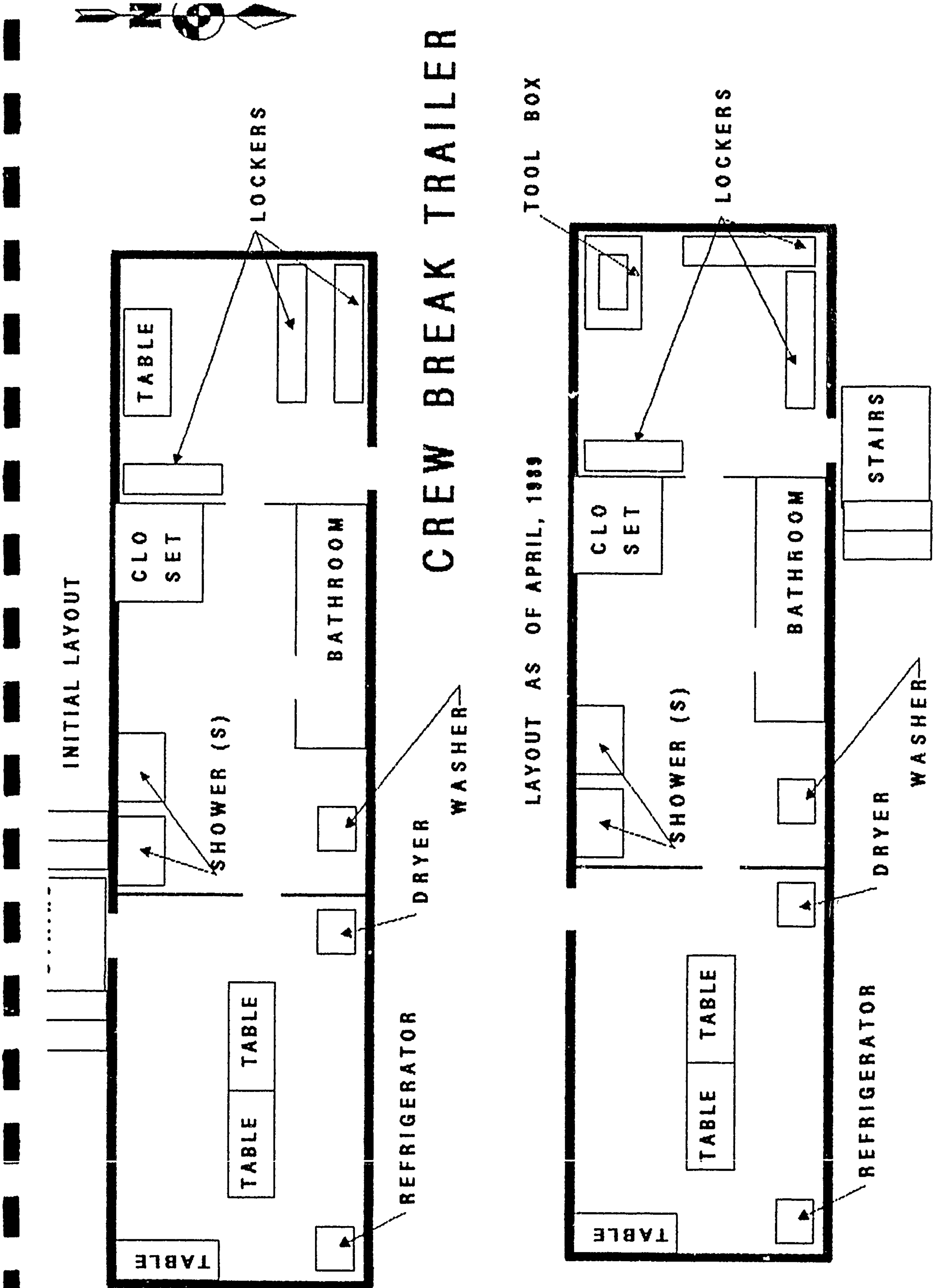
( ) indicates
measurement is a swipe
initially counted for
beta-gamma activity and
recounted for alpha activity

DATE	LOCATION	MIN.	MAX.	# READINGS
		dpm/100cm2		
Sep 20,	Crew trailer	*(B)	*(B)	10
1988	ACOE trailer	*(B)	*(B)	10
Sep 27,	ACOE trailer	0(A)	1.3(A)	(11)
1988		*(B)	*(B)	11
	Crew trailer	0(A)	7.2(A)	(20)
		*(B)	4.5(B)	20
Sep 28,	CNSI trailer	*(A)	6.9(A)	(20)
1988		*(B)	20.9(B)	20
Sep 29,	OSF/CP	11.8(A)	17.6(A)	(2)
1988		142(B)	237(B)	2
	OSF/CP	0(A)	34(A)	(10)
		0(B)	0(B)	10
Oct 05,	CNSI trailer	*(A)	*(A)	(10)
1988		*(B)	49(B)	10
	ACOE trailer	*(A)	*(A)	(10)
		*(B)	100(B)	10
	Crew trailer	*(A)	2(A)	(10)
		*(B)	66(B)	10
Oct 11,	CNSI trailer	6.4(A)	12.9(A)	(10)
1988		*(B)	*(B)	10
	ACOE trailer	0(A)	12.9(A)	(10)
		*(B)	200(B)	10
	Crew trailer	0(A)	0(A)	(10)
		*(B)	200(B)	10
	OSF/CP	*(A)	6.4(A)	(10)
		*(B)	*(B)	10
Oct 18,	Crew trailer	*(A)	*(A)	(11)
1988		*(B)	200(B)	11
	CNSI trailer	*(A)	*(A)	(9)
		*(B)	*(B)	9
	ACOE trailer	*(A)	*(A)	(10)
		*(B)	*(B)	10
	Guard shack	*(A)	*(A)	(4)
		*(B)	*(B)	4
Nov 2,	CNSI trailer	*(B)	26.3(B)	7
1988	Crew trailer	2.2(A)	5.14(A)	(11)
		*(B)	42.1(B)	11
	ACOE trailer	*(A)	2.2(A)	(3)
		*(B)	68.4(B)	3
	OSF/CP	8.08(A)	19.85(A)	(9)
		*(B)	52.6(B)	9
	Crew trailer	*(B)	35(B)	9



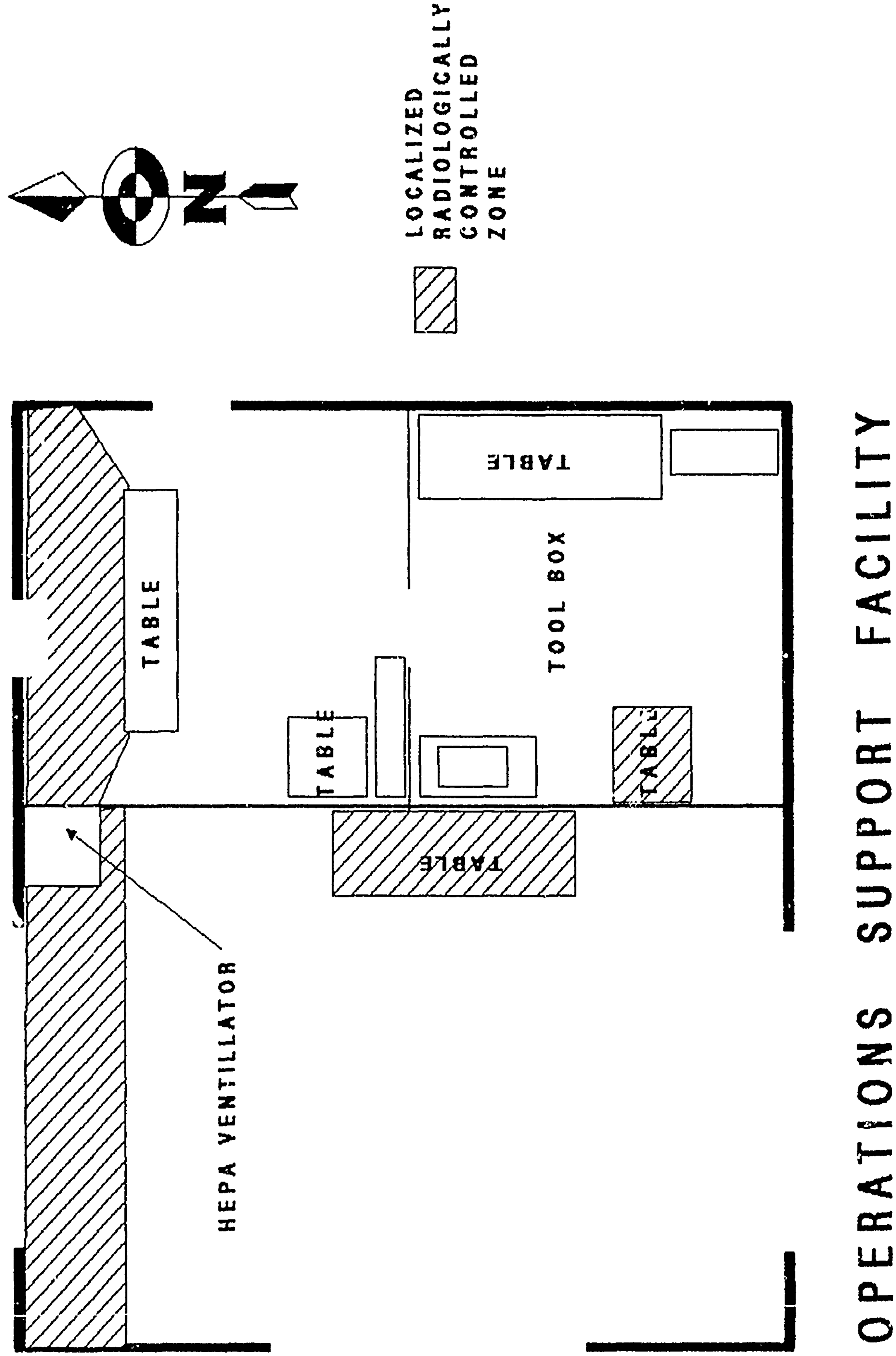
MAP D.1 - CNSI OFFICE TRAILER

DATE	LOCATION	MIN. dpm/100cm2	MAX. dpm/100cm2	# READINGS
Nov 11,	CNSI trailer	*(A)	.91(A)	(6)
1988		*(B)	45(B)	6
	ACOE trailer	*(A)	1.19(A)	(3)
		*(B)	85(B)	3
	OSF/CP	4.88(A)	10.73(A)	(12)
		*(B)	60(B)	12
Nov 18,	CNSI trailer	*(A)	10(A)	(7)
1988		*(B)	61.9(B)	7
	Crew trailer	*(A)	148(A)	(4)
		(B)	480.9(B)	4
	ACOE trailer	*(A)	1(A)	(3)
		*(B)	38(B)	3
	Office steps	14.2(B)	14.2(B)	1
	OSF/CP	13(A)	13(A)	
		*(B)	80.9(B)	11
Nov 22,	CNSI trailer	*(B)	28.6(B)	5
1988	OSF/CP	2(A)	20(A)	(10)
		*(B)	66.6(B)	10
	ACOE trailer	*(B)	14.3(B)	3
	Crew trailer	2(A)	17(A)	(12)
		*(B)	38.1(B)	12
Nov 23,	CNSI trailer	*(B)	400(B)	20
1988	Crew trailer	*(B)	400(B)	20
Dec 07,	CNSI trailer	*(A)	16(A)	(40)
1988		4.5(B)	50(B)	40
	ACOE trailer	*(A)	2(A)	(3)
		*(B)	45.5(B)	3
	Crew trailer	*(B)	27.3(B)	7
	OSF/CP	10(A)	25(B)	(12)
		*(B)	77.2(B)	12
Dec 14,	CNSI trailer	*(A)	2(B)	(5)
1988		3.4(B)	44.3(B)	5
	ACOE trailer	2(A)	2(A)	(3)
		7.9(B)	26.1(B)	3
Crew trailer		*(B)	67(B)	9
	OSF/CP	5(A)	5(A)	(8)
		*(B)	112.5(B)	8
Dec 17, 1988	Uncont. area	*(B)	85(B)	35
Jan 03,	Crew trailer	*(A)	2.2(A)	(10)
1989		*(B)	42.8(B)	10
	CNSI trailer	2.2(A)	2.2(A)	(10)
		*(B)	37.8(B)	10
ACOE trailer		*(B)	27.8(B)	5



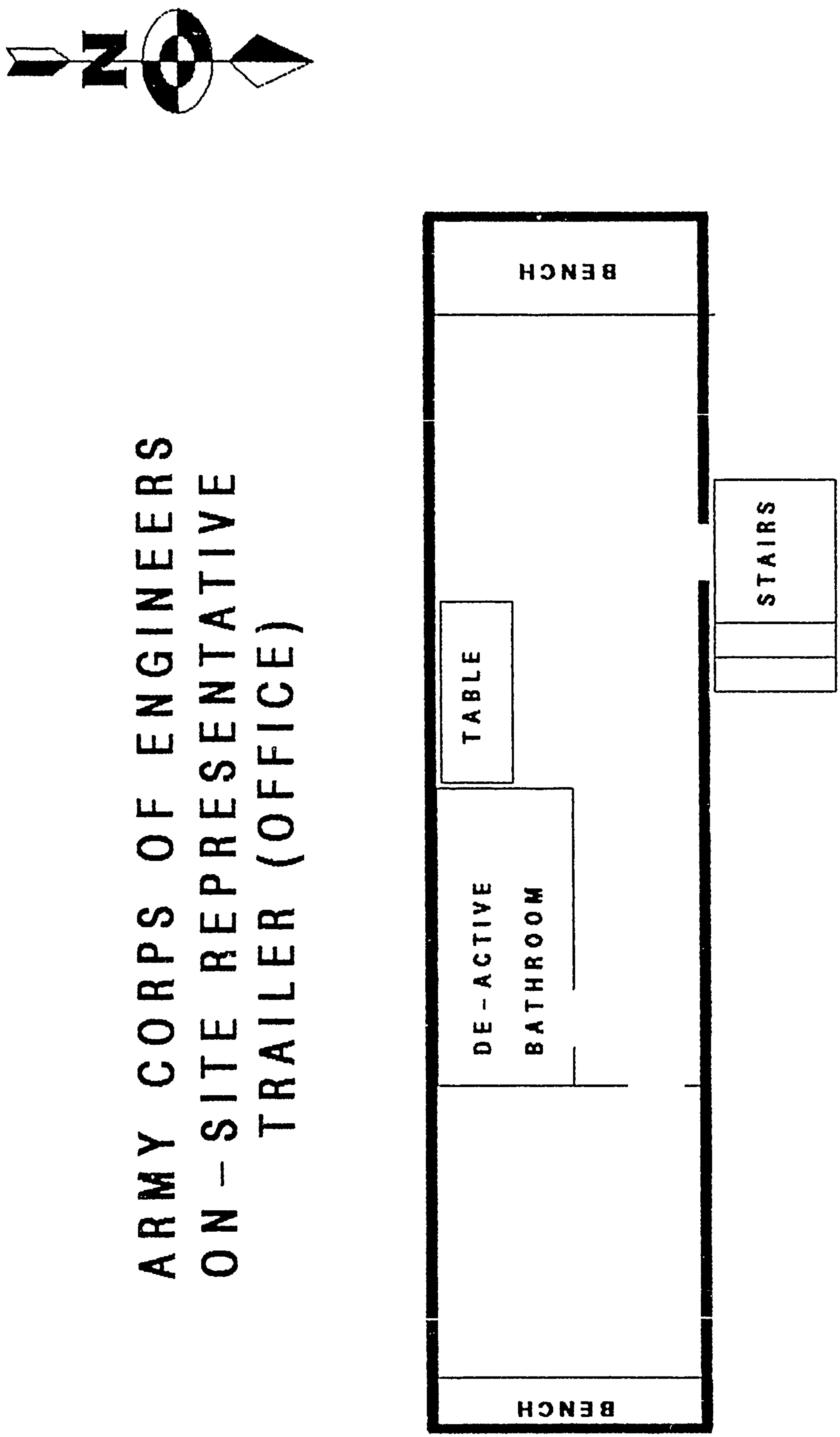
MAP D.2 - CREW BREAK TRAILER

DATE	LOCATION	MIN.	MAX.	# READINGS
		dpm/100cm2		
Jan 11,	CNSI trailer	2(A)	2(A)	(5)
1989		*(B)	19.5(B)	5
	ACOE trailer	*(A)	2(A)	(4)
		*(B)	55.9(B)	4
	Crew trailer	*(B)	19.5(B)	4
	Guard shack	*(B)	37.7(B)	4
	OSF/CP	*(A)	*(A)	(8)
		*(B)	55.9(B)	8
Jan 14,	Crew trailer	*(B)	25.8(B)	10
1989	CNSI trailer	*(B)	57.4(B)	10
Jan 18,	Crew trailer	*(B)	54(B)	10
1989	CNSI trailer	2.2(A)	11(A)	(10)
		*(B)	40.4(B)	10
	Guard shack	*(A)	*(A)	(5)
		*(B)	45(B)	5
	ACOE trailer	*(A)	*(A)	(5)
		*(B)	36(B)	5
	Port o let 1	*(B)	*(B)	1
	Port o let 2	*(B)	*(B)	1
Jan 21,	Crew trailer	2.1(A)	5.2(A)	(15)
1989		*(B)	37.75(B)	15
	ACOE trailer	2.1(A)	2.1(A)	(5)
		*(B)	52.75(B)	5
	CNSI trailer	*(B)	17.75(B)	5
	Guard shack	*(B)	27.75(B)	5
Jan 30,	Crew trailer	6(A)	6(A)	(10)
1989		*(B)	85(B)	10
	CNSI trailer	3(A)	3(A)	(10)
		*(B)	33(B)	10
	ACOE trailer	*(B)	18.3(B)	5
	Guard shack	3(A)	3(A)	(5)
		*(B)	47(B)	5
Feb 06,	Crew trailer	*(B)	64.3(B)	10
1989	CNSI trailer	2.1(A)	2.1(A)	(10)
		*(B)	73.8(B)	10
	ACOE trailer	*(B)	31(B)	5
	OSF/CP	2.1(A)	2.1(A)	(15)
		*(B)	64.3(B)	15
Feb 11,	Crew trailer	2.17(A)	15.5(A)	(10)
1989		*(B)	24.76(B)	10
	CNSI trailer	*(B)	*(B)	10
	OSF/CP	8.83(A)	8.83(A)	(15)
		*(B)	34.29(B)	15
	ACOE trailer	*(B)	9.5(B)	5



MAP D.3 - OPERATIONS SUPPORT FACILITY

DATE	LOCATION	MIN.	MAX. dpm/100cm2	# READINGS
Feb 15, 1989	Crew trailer	*(A)	2(A)	(2)
		*(B)	115.78(B)	20
	CNSI trailer	1(A)	1(A)	(2)
		*(B)	326.31(B)	20
Feb 15, 1989	ACOE trailer	*(B)	52.63(B)	10
	Guard Shack	*(B)	152.63(B)	5
Feb 17, 1989	CNSI trailer	*(B)	31.36(B)	25
Feb 18, 1989	Crew trailer	*(A)	4(A)	20
	Army Trailer	*(B)	89.1(B)	20
Feb 20, 1989	107 Drive Way	*(B)	57.3(B)	10
	Clean Soil	*(B)	16.4(B)	5
Feb 21, 1989	ACOE trailer	*(B)	*(B)	10
	Crew trailer	*(A)	*(A)	(10)
		*(B)	29.25(B)	10
	Radcon office	*(B)	24.25(B)	10
Feb 25, 1989	Crew Trailer	*(B)	39.5(B)	20
	Army Trailer	*(B)	68.1(B)	20
Feb 28, 1989	Crew Trailer	*(A)	3(A)	(3)
		*(B)	48(B)	20
	Army Trailer	*(A)	1(A)	(3)
		*(B)	23(B)	10
Mar 09, 1989	Crew trailer	*(A)	1(A)	(6)
		*(B)	74.1(B)	20
Mar 10, 1989	Army Trailer	*(B)	18.89(B)	10
	Radcon Office	*(B)	2.22(B)	5
Mar 14, 1989	Crew TRailer	*(B)	87.2(B)	20
	Army Trailer	*(B)	49.7(B)	10
	Counting Room	*(B)	*(B)	2
	Control Point	*(B)	68.4(B)	2
	O.S.F.	12.2(B)	68.4(B)	2
Mar 20, 1989	Control Point	*(B)	66(B)	5
	O.S.F.	*(B)	47.2(B)	5
	E. STRATFORD	*(B)	53.4(B)	10
	Crew Trailer	*(B)	59.7(B)	20
	Army Trailer	*(B)	59.7(B)	10
Mar 21, 1989	O.S.F.	*(A)	*(A)	(2)
		*(B)	52.7(B)	6



MAP D.4 - ARMY CORPS OF ENGINEERS TRAILER

DATE	LOCATION	MIN.	MAX.	# READING
		dpm/100cm2		
Mar 23,	Radcon Office	*(B)	9.1(B)	5
1989	Radcon Lab	4(A)	4(A)	(3)
		*(B)	177.8(B)	15
deconned				
	Crew Trailer	*(A)	10(A)	(8)
		*(B)	80.6(B)	20
deconned				
	Army Trailer	*(A)	2.3(A)	(3)
		*(B)	55.6(B)	10
Mar 27,	O.S.F.	2.2(A)	5.3(A)	(2)
1989		*(B)	46.6(B)	7
	Control Point	*(A)	5.3(A)	(3)
		*(B)	65.3(B)	17
	E.Stratford St.	*(B)	90.3(B)	5
Mar 29,	Radcon Lab	*(A)	1.8(A)	(2)
1989		*(B)	26(B)	5
	Crew Trailer	*(A)	5.6(A)	(6)
	Army Trailer	*(B)	113.6(B)	(deconned) 10
	Control Point	*(A)	2.6(A)	(5)
	Counting Room	*(A)	17.4(A)	(15)
deconned				
	O.S.F.	*(B)	52.7(B)	20
Mar 30,	E. Stratford	*(A)	11.36(A)	(8)
1989	sidewalk	*(B)	136(B)	15
Mar 31,	Crew Trailer	*(A)	5.4(A)	(14)
1989		*(B)	72.65(B)	40
	O.S.F.	*(A)	5.47(A)	(6)
		*(B)	78.53(B)	10
	Army Trailer	*(A)	*(A)	(1)
		*(B)	37.35(B)	10
Apr 03,	Crew Trailer	*(A)	5.62(A)	(3)
1989		*(B)	6063(B)	20
	Army Trailer	*(A)	1.97(A)	(3)
		*(B)	65.67(B)	11
April 04,	E. Stratford	*(A)	2.0(A)	(7)
1989	Within Gates	*(B)	72.33(B)	20
Apr 05,	Crew Trailer	*(A)	1.97(A)	(9)
1989		*(B)	79(B)	20
Apr 06,	Army Trailer	*(A)	*(A)	(2)
1989		*(B)	45.67(B)	13
	Crew Trailer	1(A)	1(A)	(1)
		*(B)	52.33(B)	5

DATE	LOCATION	MIN.	MAX. dpm/100cm2	# READING
Apr 07, 1989	Crew Trailer	*(A)	1.72(A)	(6)
		*(B)	53.24(B)	20
	RADCON Lab	*(A)	*(A)	(2)
		*(B)	23.82(B)	5
	Army Trailer	*(A)	*(A)	(2)
		*(B)	52(B)	10
Apr,11, 1989	Guard Shack	*(A)	1.61(A)	(2)
		*(B)	72(B)	5
	Crew Trailer	*(A)	1.61(A)	(5)
		*(B)	58.67(B)	20
	Side Walk	*(B)	58.67(B)	10
	Counting Room	*(A)	*(A)	(1)
		*(B)	52(B)	5
	O.C.S. Lab	*(A)	*(A)	(1)
		*(B)	45.33(B)	5
	Army Trailer	*(A)	*(A)	(3)
		*(B)	52(B)	10
	E. Stratford St.	*(A)	1.61(A)	(4)
		*(B)	78.67(B)	20
Apr 13, 1989	Army Trailer	*(A)	*(A)	(2)
		*(B)	92(B)	10
	Guard Shack	*(A)	*(A)	(3)
		*(B)	78.67(B)	5
	Port-O-Let	*(B)	25.33(B)	2
	Crew Trailer	*(A)	*(A)	(11)
		*(B)	105(B)	20
	Counting Room	*(A)	*(A)	(3)
		*(B)	77.33(B)	5
	E. Stratford St.	*(A)	2.26(A)	(4)
		*(B)	104(B)	19
Apr 06, 1989	Counting Room	*(A)	*(A)	(1)
		*(B)	44(B)	5
Apr 18, 1989	E. Stratford Within gates	*(A)	5.35(A)	(7)
		*(B)	113.33(B)	30
	Army Trailer	*(A)	2.13(A)	(10)
		*(B)	60(B)	10
	Guard Shack	*(A)	*(A)	(1)
		*(B)	53.33	5
	Counting Room	*(A)	*(A)	(1)
		*(B)	6.66(B)	5
	Radcon Lab	*(A)	*(A)	(1)
		*(B)	86.67(B)	5
	Crew Trailer	*(A)	2.13(A)	(5)
		*(B)	80(B)	30

DATE	LOCATION	MIN.	MIX.	# READING
		dpm/100cm2		
Apr 20, 1989	Guard Shack	*(A)	*(A)	(1)
		*(B)	32.67(B)	5
	Crew Trailer	*(A)	*(A)	(7)
		*(B)	32.67(B)	25
	E. Stratford	*(A)	5.32(A)	(5)
	Army Trailer	*(A)	*(A)	(2)
		*(B)	12.67(B)	10
Apr 21, 1989	Crew Trailer TABLE	*(A)	2.19	(5)
		*(B)	39.33(B)	5
	E. Stratford	*(A)	2.19(A)	(5)
		*(B)	76.67(B)	30
	Radcon Lab	*(A)	*(A)	(1)
	Fruit Cellar 14x14	**(B)	600(B)	20
Apr 22, 1989	E. Stratford St.	*(A)	11.29(A)	(6)
		*(B)	91.33(B)	25
Apr 24, 1989		*(B)	22.67(B)	5
	Counting room	*(A)	*(A)	(1)
		*(B)	62.67(B)	5
Crew Trailer		*(A)	4.84(A)	(14)
		*(B)	76.67(B)	35
	Army Trailer	*(A)	*(A)	(2)
		*(B)	76(B)	10
	E. Stratford St.	*(A)	1.61(A)	(6)
		*(B)	76(B)	25

APPENDIX 2-B

UNRESTRICTED RELEASE SURVEYS

UNRESTRICTED RELEASE SURVEYS

DATE	ITEM RELEASED	MIN.	MAX. dpm/100 cm2	#READINGS	
SEP 28,	12 ROOF JACKS	*	(A) *	12D	
1988		*	(B) *	12D	
		13.60	(B) 32.00	12S	
NOV 14,	SCISSOR LIFT	*	(A) 19.00	63S	
1988		*	(A) *	63D	
		*	(B) *	63D	
NOV 23,	AIR TAMPER	*	(B) 43.00	5S	
1988		*	(B) *	5D	
FEB 13,	WOODEN CHEST	*	(B) 38.00	7S	
1989					
FEB 23,	AIR COMPRESSOR	17.80	(A) 17.80	1S	
1989		*	(B) 132.70	6S	
		*	(B) *	6D	
FEB 13,	CHINA CABINET	*	(B) 119.00	10S	
1989		*	(B) *	10D	
FEB 28,	SCAFFOLD	*	(A) .50	13S	
1989		*	(B) 58.00	40S	
		*	(B) 155.00	40D	
MAR 1,	25,000 BTU	*	(A) 2.00	4S	
1989	HEATER	*	(B) *	21S	
		*	(B) *	21D	
MAR 14,	CANOPY, HIGH LIFT	*	(B) 52.30	5S	
1989		*	(B) 178.00	5D	
MAR 14,	2000 CFM HEPA	*	(B) 99.00	10S	
1989		*	(B) 44.66	10D	
MAR 15,	CHAIN SAW	*	(B) 85.70	7S	1989
	RED	*	(B) 133.33	7D	
MAR 15,	125.000 BTU	25.70	(B) 65.70	5S	
1989	HEATER	*	(B) 190.70	5D	
MAR 20,	CHAIN SAW	2.14	(A) 2.14	1S	
1989		*	(B) 26.25	6S	
		*	(B) 47.86	6D	
MAR 22,	HOPPER	*	(A) 5.00	5S	
1989		*	(B) 32.50	5S	
		*	(B) *	5D	

DATE	ITEM RELEASED	MIN.	MAX. dpm/100 cm2	#READINGS
MAR 22, 1989	LIFT BOXES	*	(A) 1.43	4S
		*	(B) 55.62	4S
		*	(B) *	4D
MAR 22, 1989	HOPPER #2	*	(A) 5.00	2S
		*	(B) 76.25	5S
		*	(B) **	5D
MAR 23, 1989	JACK HAMMER	*	(A) 4.30	4S
		*	(B) 49.40	4S
		*	(B) *	4D
MAR 27, 1989	500 CFM HEPA	*	(A) *	5S
		*	(B) *	5S
		*	(B) **	5D
APR 3, 1989	500 CFM HEPA	2.26	(A) 5.48	2S
		*	(B) 53.33	8S
		*	(B) *	8D
APR 3, 1989	POLMAN HOLT VAC.	*	(A) *	3S
		*	(B) 13.30	8S
		*	(B) **	8D
APR 4, 1989	POLMAN HOLT VAC. WHITE	*	(A) 2.26	4S
		*	(B) 46.67	9S
		*	(B) *	9D
APR 4, 1989	O.S.F.	*	(A) 8.71	89S
		*	(B) 113.00	347S
APR 4, 1989	BRUSH PILE	*	(B) 71.40	1D
APR 5, 1989	LOCKERS	*	(A) 5.09	4S
		*	(B) 79.00	12S
		*	(B) *	12D
APR 14, 1989	HEPA DUCT VENT	*	(A) *	1S
		*	(B) 78.30	3S
		*	(B) 142.80	3D
APRIL 25, 1989	CARLUCCI LUMBER	*	(A) *	20S
		*	(B) 75.30	20S
		*	(B) *	20D
APR 26, 1989	1000 CFM HEPA	*	(A) 1.90	4S
		*	(B) 60.60	10S
		*	(B) *	12D

DATE	ITEM RELEASED	MIN.		MAX.	#READINGS
		dpm/100 cm2			
MAY 1, 1989	FORK TRUCK (MANITOUS)	*	(A)	*	4S
		*	(B)	78.10	20S
		*	(B)	*	20D
MAY 3, 1989	POCLAIN	*	(A)	2.30	5S
		*	(B)	90.00	25S
		*	(B)	*	25D
MAY 4, 1989	SHORING JACKS	*	(A)	*	2S
		*	(B)	55.70	5S
		*	(B)	*	5D
MAY 5, 1989	ALPHA CAM'S #665 #614 #619 #623	*	(A)	2.17	6S
		*	(B)	38.57	28S
MAY 5, 1989	AMS-3 CAM'S #528 #1958 #1962	*	(A)	5.50	10S
		*	(B)	95.70	25S
		*	(B)	*	25D
MAY 5, 1989	EBERLINE PUMP (R.A.S.P.) #0887-1-11	*	(A)	*	2S
		*	(B)	60.00	11S
MAY 5, 1989	6 FT. STEP LADDER	2.2	(A)	18.20	3S
		*	(B)	80.70	5S
		*	(B)	*	5D
MAY 6, 1989	EXT.LADDER	*	(A)	*	2S
		*	(B)	20.70	6S
		*	(B)	*	6D
MAY 6, 1989	AIR COMPRESSOR	2.2	(A)	5.50	3S
		*	(B)	87.30	8S
		*	(B)	*	8D
MAY 06, 1989	BOMAG	*	(A)	*	2S
		*	(B)	60.70	6S
		*	(B)	*	6D
MAY 6, 1989	RUBBER TRACK MATS	*	(A)	12.20	2S
		*	(B)	27.30	7S
		*	(B)	*	7D

DATE	ITEM RELEASED	MIN.		MAX. dpm/100 cm2	#READINGS
MAY 6,	SOIL WACKER	*	(A)	2.20	2S
1989		*	(B)	*	4S
		*	(B)	*	4D
MAY 08,	LOCKERS	*	(A)	1.83	3S
1989		*	(B)	86.00	12S
		*	(B)	*	12D
MAY 08,	WASHER & DRYER	1.83	(A)	1.83	1S
1989		*	(B)	119.00	8S
MAY 08,	FUEL TANK	*	(A)	*	1S
1989		*	(B)	*	6S
		*	(B)	119.00	6D
MAY 08,	CAT FORK TRUCK	*	(A)	2.00	3S
1989		*	(B)	66.00	15S
		*	(B)	48.00	15D
MAY 08,	ARC WELDER	*	(A)	*	2S
1989		*	(B)	12.33	10S
		*	(B)	*	10D
MAY 09,	MISC. TOOLS	*	(A)	*	2S
1989	SHOVELS	*	(B)	55.00	9S
	PIC AXES	*	(B)	*	9D
MAY 09,	MISC. TOOLS	*	(A)	*	2S
1989	NINE IRON BARS	*	(B)	28.67	10S
	ONE SHOVEL	*	(B)	154.00	10D
MAY 09,	THREE AIR HOSES	*	(A)	*	1S
1989		*	(B)	15.33	3S
		*	(B)	154.00	3D
MAY 09,	ELEVEN SHOVELS	*	(A)	*	2S
1989	ONE HAND TRUCK	*	(B)	49.00	12S
		*	(B)	154.00	12D
MAY 09,	JOHN DEERE	2.0	(A)	5.30	2S
1989	BACK HOE	*	(B)	95.33	16S
		*	(B)	*	16D
MAY 09,	HEPA DRUM VAC.	*	(A)	2.00	2S
1989		*	(B)	62.00	11S
		*	(B)	*	11D

DATE	ITEM RELEASED	MIN.	MAX. dpm/100 cm2	#READINGS
MAY 15, 1989	MISC. TOOLS	*	(A) 3.10	5S
	BROOMS	*	(B) 24.20	14S
	SHOVELS	*	(B) 154.00	14D
MAY 15, 1989	POWER CABLES	*	(A) *	3S
	AIR HOSES	*	(B) 63.00	18S

APPENDIX 2-C

WATER ANALYSES

WATER ANALYSES

SAMPLE	Date Taken	µCi/ml	
LD-WW-001	09-12-88	3.92 E-07	
LD-WW-002	09-12-88	3.78 E-08	
LD-WW-003	09-13-88	-4.73 E-08	
LD-WW-006	09-26-88	1.32 E-07	
LD-WW-007	09-19-88	* 6.82 E-07	
LD-WW-008	09-20-88	1.66 E-07	105 SUMP
LD-WW-009	09-21-88	0.00 E+00	105 BLADDER
LD-WW-010	09-21-88	* 6.54 E-07	
LD-WW-011	09-22-88	3.62 E-07	
LD-WW-012	09-22-88	* 9.45 E-07	
LD-WW-013		2.14 E-07	
LD-WW-014		* 4.19 E-07	
LD-WW-0[illegible]		8.52 E-07	
LD-WW[illegible]		4.11 E-07	
LD-W[illegible]		1.46 E-07	
LD-WW-[illegible]		6.28 E-08	
LD-WW-018	09-2[illegible]-88	1.26 E-07	107 DRUM #11
LD-WW-019	09-30-88	1.6 E-07	
LD-WW-020	10-06-88	1.19 E-07	
LD-WW-021	10-10-88	4.94 E-08	
LD-WW-022	10-14-88	1.14 E-07	
LD-WW-023	10-17-88	* 4.23 E-07	
LD-WW-024	10-18-88	5.72 E-08	
LD-WW-025	10-21-88	7.0 E-08	
LD-WW-026	10-26-88	1.08 E-07	
LD-WW-027	10-31-88	5.2 E-08	
LD-WW-028	11-01-88	5.7 E-08	
LD-WW-029	11-03-88	1.95 E-07	
LD-WW-030	11-05-88	2.80 E-07	
LD-WW-031	11-09-88	1.88 E-07	
LD-WW-032	11-12-88	1.46 E-07	
LD-WW-033	11-16-88	1.39E-08	
LD-WW-034	11-17-88	* 1.57 E-06	RAIN
ACCUMULATION			
LD-WW-035	11-18-88	1.95 E-07	
LD-WW-036	11-19-88	3.7 E-07	
LD-WW-037	11-23-88	1.26 E-07	
LD-WW-038	11-28-88	1.22 E-07	RAIN
ACCUMULATION			
LD-WW-039	11-29-88	8.36 E-08	
LD-WW-040	12-03-88	8.36 E-08	
LD-WW-041	12-06-88	1.1 E-07	
LD-WW-042	12-09-88	3.49 E-08	
LD-WW-043	12-15-88	1.03 E-07	105 BASEMENT

SAMPLE	DATE TAKEN	µCi/ml	
LD-WW-044	12-20-88	1.55 E-07	
LD-WW-045	02-01-89	-4.2 E-08	107 BLADDER
LD-WW-046	02-14-89	0.00 E+00	
LD-WW-047	02-14-89	1.97 E-08	
LD-WW-048	02-14-89	4.3 E-08	
LD-WW-049	02-15-89	-7.4 E-09	DISTILLED WATER
LD-WW-050	02-16-89	* 4.81 E-07	
LD-WW-051	02-16-89	5.42 E-08	
LD-WW-052	02-16-89	1.48 E-07	
LD-WW-053	02-17-89	1.7 E-07	
LD-WW-054	02-17-89	1.26 E-07	
LD-WW-055	02-21-89	* 3.86 E-06	
LD-WW-056	02-21-89	5.58 E-08	
LD-WW-057	02-23-89	* 2.72 E-06	
LD-WW-058	02-23-89	2.79 E-07	
LD-WW-059	02-25-89	* 4.3 E-06	
LD-WW-060	02-28-89	1.94 E-07	
LD-WW-061	02-28-89	2.50 E-07	
LD-WW-062	02-28-89	2.72 E-07	
LD-WW-063	05-03-89	9.94 E-08	

* Indicates waste water was above release criteria. As previously described, waste water was filtered and re-sampled.

CHAPTER 3

LANSDOWNE

RADIOACTIVE RESIDENCE COMPLEX
DISMANTLEMENT/REMOVAL PROJECT

RADIOLOGICAL CLOSEOUT REPORT

CHEM-NUCLEAR SYSTEMS, INC.
220 STONERIDGE DRIVE
COLUMBIA, SOUTH CAROLINA

CHAPTER 3
HEALTH PHYSICS FILING SYSTEM

RADIOLOGIC CLOSEOUT REPORT
HEALTH PHYSICS FILING SYSTEM

TABLE OF CONTENTS

LIST OF TABLES

(2289R)

LANSDOWNE RADIOACTIVE RESIDENCE COMPLEX
DISMANTLEMENT/REMOVAL PROJECT

RADIOLOGICAL AND HEALTH AND SAFETY DATA SUMMARY AND SYNOPSES
HEALTH PHYSICS FILING SYSTEM

1.0 INTRODUCTION

Throughout the course of the Lansdowne Project, varied radiologic safety programs were instituted to ensure that all remedial action was performed in a safe manner not only to the worker, but to the public at large. This was accomplished by performing all work operations in accord with the plans established prior to beginning this project. To provide written confirmation that the radiologic safety programs were performed in accordance with various plans, the relevant data generated was retained on-site. These data were recorded on data sheets and filed. To provide more ready access to the data upon transmission to the Army Corps of Engineers at the termination of the project, a filing system was devised.

2.0 GENERAL

The filing system developed for the radiologic records is divided into twenty categories. Each major category contains a varying number of divisions. The function of the divisions was to separate each of the varied data forms which were pertinent to a specific category. Presented in the following is an index of the health physics filing systems.

(2289R)

TABLE 2.1 - HEALTH PHYSICS FILING SYSTEM DIAGRAM

HP-46025-01 **DOSIMETRY**

- 01 TLD ISSUE SUMMARY
- 02 VENDOR DOSIMETRY REPORTS
- 03 LOST DOSIMETRY REPORTS
- 04 QUARTERLY SUMMARY REPORT
- 05 (NOT USED)
- 06 DAILY SIGN IN SHEET

HP-46025-02 **BIOASSAY**

- 01 URINALYSIS REPORTS
- 02 FECAL RESULTS - NOT USED
- 03 WHOLE BODY RESULTS
- 04 INTERNAL DOSE ASSIGNMENTS - NOT USED
- 05 MEMOS CONCERNING BIOASSAY
- 06 LABORATORY AUTHORIZATIONS

HP-46025-03 **ENVIRONMENTAL AIR SAMPLES**

- 01 SAMPLE LOCATION MAP
- 02 CONTINUOUS AIR MONITORS
  - 01 STRIP CHARTS - TRANSMITTED ACOE PREVIOUSLY
  - 02 ON-SITE ANALYSIS CALCULATION SHEET
  - 03 VENDOR ANALYSIS REPORTS
- 03 GRAB AIR SAMPLES
  - 01 ON-SITE ANALYSIS CALCULATION SHEETS
  - 02 VENDOR ANALYSIS REPORTS
- 04 WORKING LEVEL MEASUREMENTS
- 05 MEMOS
- 06 LABORATORY AUTHORIZATIONS
  - 01 RECEIPT OF SAMPLES BY VENDOR
- 07 WEATHER DATA SHEETS

HP-46025-04 **OCCUPATIONAL AIR SAMPLES**

- 01 AREA MAP
- 02 CONTINUOUS AIR MONITOR
  - 01 STRIP CHART - TRANSMITTED TO ACOE PREVIOUSLY
  - 02 ON-SITE ANALYSIS CALCULATION SHEETS
  - 03 VENDOR ANALYSIS REPORT
- 03 GRAB AIR SAMPLES
  - 01 ON-SITE ANALYSIS CALCULATION SHEETS
  - 02 VENDOR ANALYSIS REPORTS
- 04 WORKING LEVEL MEASUREMENTS
- 05 MEMOS
- 06 LABORATORY AUTHORIZATIONS
- 07 AIR PARTICULATE DATA

(2289R)

HP-46025-05	**GAMMA SURVEYS**	
	01	PIC vs 2220 CORRELATION DATA AND GRAPHS
	02	SITE BOUNDARY SURVEYS
	03	RAD STORAGE AREAS - NOT USED
	04	WORK AREA SURVEY
	05	ACCESS CONTROL
		01 GAMMA SURVEYS
	06	(NOT USED)
	07	MISCELLANEOUS
HP-46025-06	ROUTINE SWIPE SURVEYS	
	01	ACCESS CONTROL
	02	(NOT USED)
	03	(NOT USED)
	04	UNRESTRICTED RELEASE SURVEYS
		01 FURNITURE DECONTAMINATION
	05	105 E. STRATFORD
		01 BASEMENT
		02 MAIN FLOOR
		03 SECOND FLOOR
		04 THIRD FLOOR
	06	107 E. STRATFORD
		01 BASEMENT
		02 MAIN FLOOR
		03 SECOND FLOOR
		04 THIRD FLOOR
HP-46025-07	**SITE SOIL SAMPLING PROGRAM**	
	01	MAP SHOWING LOCATIONS
	02	DELTA CORRELATION DATA AND GRAPHS
	03	OCS CORRELATION DATA AND GRAPHS
	04	FINAL EXCAVATION CONTROL OCS RESULTS
	05	VENDOR ANALYSIS REPORTS
	06	SITE OCS ANALYSIS
	07	LABORATORY AUTHORIZATIONS
	08	OFF-SITE ANALYSES
	09	EXCAVATION PRINTOUTS
		01 CONTROL SAMPLES
		02a ARGONNE SPLITS INITIAL
		02b ARGONNE SPLITS FINAL
	10	CERTIFICATION PRINTOUTS
		01 INITIAL COUNTS IN-SITU SAMPLES
		02 FINAL COUNTS IN-SITU SAMPLES
		03 INITIAL COUNTS BACKFILL SAMPLES
		04 FINAL COUNTS BACKFILL SAMPLES

(2289R)

HP-46025-08 **WATER SAMPLING PROGRAM**

- 01 MAP SHOWING LOCATIONS - NOT USED
- 02 VENDOR ANALYSIS OF WATER
- 03 ON-SITE ANALYSIS OF WATER

HP-46025-09 **COUNTING INSTRUMENT CHECKS**

- 01 L2220
  - 01 PLATEAUS
  - 02 DAILY RESPONSE CHECK
- 02 ESP
  - 01 PLATEAUS
  - 02 DAILY RESPONSE CHECK
- 03 L2000
  - 01 PLATEAUS
  - 02 DAILY RESPONSE CHECK (R.F.)
- 04 BC4
  - 01 PLATEAUS
  - 02 DAILY RESPONSE CHECK (R.F.)
- 05 OCS
  - 01 DAILY RESPONSE CHECK
  - 02 RELIABILITY CHECKS
    - a. RADIUM
    - b. THORIUM
    - c. BACKGROUND
  - 03 OCS MEMOS
- 06 PAC 4G
  - 01 DAILY RESPONSE CHECK
- 07 E520
  - 01 DAILY RESPONSE CHECK
- 08 E120
  - 01 DAILY RESPONSE CHECK
- 09 LUDLUM
  - 01 DAILY RESPONSE CHECK
- 10 EBERLINE RM 14
  - 01 DAILY RESPONSE CHECK
- 11 EBERLINE RM 20
  - 01 DAILY RESPONSE CHECK
- 12 EBERLINE RM 21
  - 01 DAILY RESPONSE CHECK

HP-46025-10 **NOT USED**

HP-46025-11 **NOT USED**

HP-46025-12 **WEEKLY HIGHLIGHTS**

- 01 WEEKLY REPORTS
- 02 PROGRESS MEETINGS
- 03 WEEKLY PERSONNEL AGENDA

(2289R)

HP-46025-13	**HP CORRESPONDENCE**	
	01	SAFETY VIOLATIONS
	02	UNUSUAL OCCURRENCE REPORTS
	03	RECORD OF PHONE CONVERSATIONS - NOT USED
	04	SAFETY MEETINGS
	05	GENERAL
	06	MEMOS INCOMING CNSI
	07	MEMOS OUTGOING CNSI
HP-46025-14	**INSTRUMENT CALIBRATION DATA**	
	01	CERTIFICATES OF CALIBRATION
	02	INSTRUMENT MANUALS - NOT SUBMITTED
	03	INVENTORY
	04	LOSS/DAMAGE REPORTS
	05	MEMOS
HP-46025-15	**AUDITS**	
	01	EPA
	02	ACOE
	03	INTERNAL
HP-46025-16	**PERSONNEL FILES (kept by name and contractor)**	
	01	PFS
	02	TESTS
	03	US NRC FORM 4
	04	CURRENT QUARTER HISTORY
	05	REQUEST FOR HISTORY
	06	RESPIRATORY QUALIFICATIONS
	07	WHOLE BODY INFORMATION
	08	AUTHORIZATION SUMMARY
	09	CLEARANCE LETTER
	10	PERSONNEL CONTAMINATION REPORTS
	11	REPRIMAND/DISQUALIFICATION
HP-46025-17	**SOURCE INVENTORY**	
HP-46025-18	**BORROW MATERIAL SURVEY**	
HP-46025-19	**VISITOR FILES**	
HP-46025-20	**TRAINING FILE**	
	01	OVERHEADS (RADCON)
	02	TRAINING OUTLINE (RADCON)
	03	TEST (MASTER RADCON)
	04	OVERHEADS (INDUSTRIAL HYGIENE)
	05	TRAINING OUTLINE (INDUSTRIAL HYGIENE)
HP-46025-21	**NOT USED**	

(2289R)

HP-46025-22	**SPECIAL SURVEYS**	
	01	GAMMA
	02	SWIPES
	03	WL
	04	AIR PARTICULATE
	05	WATER
	06	SOIL
	07	ALPHA
	08	BETA GAMMA
	09	MEMOS
HP-46025-23	**INDUSTRIAL HYGIENE**	
	01	PHASE HAZARD ANALYSIS
	02	SPECIAL SURVEYS

(2289R)

LANSDOWNE

RADIOACTIVE RESIDENCE COMPLEX
DISMANTLEMENT/REMOVAL PROJECT

RADIOLOGICAL CLOSEOUT REPORT

CHAPTER 4

CHEM–NUCLEAR SYSTEMS, INC.
220 STONERIDGE DRIVE
COLUMBIA, SOUTH CAROLINA

CHAPTER 4
PHASE: DISMANTLEMENT OF THE HOUSE

RADIOLOGICAL HEALTH AND SAFETY DATA SUMMARY

PHASE: DISMANTLEMENT OF 105 / 107 EAST STRATFORD HOUSE

TABLE OF CONTENTS

LIST OF TABLES

RADIOLOGICAL HEALTH AND SAFETY DATA SUMMARY

PHASE: DISMANTLEMENT OF 105 / 107 EAST STRATFORD HOUSE

TABLE OF CONTENTS (CONTINUED)

LIST OF FIGURES

LIST OF MAPS

1.0 INTRODUCTION

During the periods of August 18, 1988 to November 19, 1988; January 10, 1989 to January 11, 1989; and February 1, 1989 to February 28, 1989, the 105 / 107 East Stratford primary structure was completely dismantled. To insure the dismantlement was performed in a safe manner not only to the worker but to the public at large, radiological monitoring programs were established. This was accomplished by performing all work operations in accordance with plans, including the Safety, Health, and Emergency Response Plan (SHERP) and the Contractor's Quality Control Plan (CQCP), which were developed prior to the beginning of the project. The following sections present descriptions and summaries of the surveys performed to verify compliance with these plans.

2.0 GENERAL

As part of the radiological air monitoring program, the following types of air samples were collected: high flow rate - occupational, low flow rate - occupational and environmental, lapel (personal) - occupational, and radon progeny (working level) - occupational and environmental. On a routine basis surveys for gamma and beta-gamma exposure rates were performed in the work area.

Prior to beginning each new major task of the dismantlement operation, a Phase Hazard Analysis was generated, explained, and signed by each worker. Along with this, weekly "Tool Box Safety Discussions" were held. At the beginning of each day of work, a verbal discussion was held, with all workers on the site attending, encompassing topics relevant to the safety issues of the day.

3.0 AIR SAMPLING PROGRAM (OCCUPATIONAL)

3.1 GENERAL

The data generated from the three types of air samples was compiled to generate a daily Maximum Permissible Concentration-hour (MPC-h) exposure. This MPC-h calculation represented the potential exposure on the site as a whole, and did not take into account personal protective equipment such as respirators or specific area controls such as HEPA ventilation and work area enclosures. The data sets are presented in Appendix G of this document. Graphic representations of the data are also provided as Figures G.1 through G.3 in Appendix G.

The air concentration criteria established for occupational

exposure is listed in Title 10 of the Code of Federal Regulations, Part 20, Appendix B, Table I. The predominant isotope of interest at the Lansdowne Project was Radium-226. The MPC value in air for soluble Radium-226 is 3.0×10^{-11} micro-curies per milliliter in air above background. Additional isotopes of concern were:

Actinium-227	2.0×10^{-12} μCi/ml
Thorium-230	2.0×10^{-12} μCi/ml
Protactinium-231	1.0×10^{-12} μCi/ml.

3.2 <u>HIGH VOLUME SAMPLES</u>

Samples were obtained with a Staplex TFIA high flow rate air sampler which drew 19 to 22 cubic feet per minute. The air was pulled through a 0.8 micron millipore glass fiber filter. The samples were collected for 10 to 20 minutes, depending on the specific flow rate, and as required to obtain sufficient volume to meet minimum detectable activity requirements.

At the end of the sampling period, the filter was placed in an envelope to prevent cross contamination of the filter media. Each filter was counted using a Ludlum 2000 scaler and Ludlum 43-10 alpha scintillation detector. Typically, filters were counted after 24 hours of decay and again after 144 hours. The count at 144 hours was used as the final gross alpha activity concentration result.

The filters were then placed in storage. Approximately ten percent of the filters was sent to Barringer Laboratories for radioisotopic analysis. The data acquired at the beginning of the project from Barringer and from the gross alpha measurements made on site were utilized to generate a general scaling factor for Radium-226, Actinium-227, Thorium-230, and Protactinium-231 versus gross alpha activity. The Radium-226 to gross alpha ratio ranged from 17% to 49%, with the average at about 22%. The ratios of the other isotopes to the gross alpha concentration were negligible, ranging from 0% to 0.7%. This indicated that Radium-226 was the predominant radioisotope of concern, and that the Radium-226 air concentration limit should be utilized to control exposures on the project.

During the period of dismantlement, as specified by procedures contained in the SHERP, 429 high volume air samples were collected. The largest potential MPC-h exposure was 2 MPC-h (^{226}Ra) per day. The minimum was not

measurable above background. The average throughout the period of dismantlement was approximately 0.43 MPC-h (^{226}Ra) per day, with large differences in daily concentrations based on specific work activities and the radiological conditions within the work area.

3.3 LOW FLOW RATE SAMPLES

Samples were obtained with a Radeco HV-809 air sampler which drew 12 cubic feet per minute. The air was pulled through a 0.8 micron millipore glass fiber filter for a period of 20 minutes. The filters were preserved and counted in the same manner as that used for the high flow rate air samples.

During the period of dismantlement, as specified by procedures contained in the SHERP, 287 low flow rate air samples were collected. The largest measured MPC-h concentration was 9.61 MPC-h of Radium-226. The minimum was not measurable above background. The average throughout the period of dismantlement was approximately 0.48 MPC-h (^{226}Ra) per day, with large differences in daily concentrations based on specific work activities and the radiological conditions within the work area.

3.4 LAPEL AIR SAMPLING

Measurements were made by collecting samples at two liters per minute over the course of a day. Typically, two Eberline Alpha-1 samplers were issued to two persons on the work crew and run throughout the course of the day. The samplers were deactivated during work break periods. The average run time for these samplers was 7.55 hours. The air was pulled through a 0.8 micron millipore glass fiber filter. The filters were preserved and counted in a manner similar to the procedure employed for the high flow rate air samples.

During the period of dismantlement, 72 lapel (breathing zone) air samples were collected. The largest MPC-h concentration was 0.48 MPC-h of Radium-226. The minimum was not measurable above background. The average throughout the period of dismantlement was approximately 0.10 MPC-h per day of Radium-226.

3.5 RADON PROGENY MEASUREMENTS (WORKING LEVELS)

Measurements were taken with an Eberline Alpha-1 air sampler which drew 2 liters per minute. The air was pulled through a membrane filter, with the sample collected for a 10 minute period.

Upon completion of sampling, the filter was placed in an envelope to prevent cross contamination of the filter media. The filters were counted using a Ludlum 2000 scaler and Ludlum 43-10 alpha scintillation detector. Typically, filters were counted after 40 minutes of decay. As many of the radon progeny are short lived, the filters for radon progeny measurements were not preserved. The data sets are presented in Appendix G of this document. A graphic representation of this data is also provided as Figure G.3 in Appendix G.

During the period of dismantlement, 89 working level measurements were made. The largest measured concentration was 1.3 MPC-h (Radon progeny), the minimum was not measurable above background.

4.0 ENVIRONMENTAL AIR SAMPLING PROGRAM

4.1 GENERAL

The environmental air concentration data sets are presented in Appendix H to this document. Graphic representations of the data are presented as Figures H.1 through H.7 in Appendix H. The air concentration criteria established for environmental exposure is contained in Title 10 of the Code of Federal Regulations, Part 20, Appendix B, Table II. The predominant isotope of interest at the Lansdowne project was Radium-226. The concentration limit for Radium-226 is 3.0×10^{-12} micro-curies per milliliter in air above background. Additional isotopes of concern were:

Actinium-227	8.0×10^{-14} μCi/ml
Thorium-230	8.0×10^{-14} μCi/ml
Protactinium-231	4.0×10^{-14} μCi/ml.

4.2 AIR PARTICULATE SAMPLES

Air particulate samples were obtained with an Eberline RAP-1 air sampler which drew 1 cubic foot per minute. The air was pulled through a 0.8 micron millipore glass fiber filter, with typical collection periods of 168 hours.

Two samplers were located at each of the four compass points on the site's perimeter. A map showing these locations is presented in Appendix J of this document. The RAP-1 air samplers are an integral part of the Eberline Continuous Air Monitor (CAM). Two types of CAM's were used at the site: the Eberline Alpha-5, an air sampling assembly using a

silicon diffusion junction for alpha radiation detection, and the Eberline AMS-3, an air sampling assembly using geiger-mueller principles for beta-gamma radiation detection. The CAM system provides a graphic representation of the relative air particulate concentration. An example of a CAM log is shown as Figure H.1 of Appendix H to this document. These units, while providing an excellent method for analyzing increasing, steady, or decreasing trends in air particulate concentrations, are primarily designed to provide a qualitative measurement rather than a quantitative one.

To provide a quantitative measurement, the filters employed in the CAM system were analyzed in a manner similar to that used for occupational air particulate samples described above. Upon completion of the sampling period, the filter was placed in an envelope to prevent cross contamination of the filter media. Each filter was then counted using a Ludlum 2000 scaler and Ludlum 43-10 alpha scintillation detector. Typically, filters were counted after 24 hours of decay and again after 144 hours. The count at 144 hours was used as the final gross alpha air concentration activity.

The filters were then placed in storage. Approximately 10 percent of the filters were sent to Barringer Laboratories for radioisotopic analysis. The data acquired at the beginning of the project from Barringer and collected on site was utilized to generate a ratio of Radium-226, Actinium-227, Thorium-230, and Protactinium-231 to gross alpha activity. The Radium-226 to gross alpha ratio ranged from 7% to 28%, with an average of about 12%. The ratios of the other isotopes to the gross alpha concentration was negligible, ranging from 0% to 0.3%. This indicated that Radium-226 was the predominant radioisotope of concern, and that the Radium-226 air concentration limit should be utilized to compare environmental concentrations to regulatory requirements.

During the period of dismantlement, in accordance with procedures contained in the SHERP and CQCP, a total of 139 environmental air particulate samples were collected. The total number of samples collected from each station was as follows: Station #1 (south) - 35, Station #2 (west) - 36, Station #3 (north) - 34, and Station #4 (east) - 34. The environmental air sampling results are presented in Appendix H at the end of this chapter.

4.3 RADON PROGENY (WORKING LEVEL) MEASUREMENTS

Samples were obtained with an Eberline Alpha-1 air sampler which drew 2 liters per minute. The air was pulled through

a membrane filter for a 10 minute period.

Upon completion of the sample period, the filter was placed in an envelope to prevent cross contamination of the filter media. Each filter was then counted using a Ludlum 2000 scaler and Ludlum 43-10 alpha scintillation detector. Typically, filters were counted after 40 minutes of decay. As radon progeny are short lived, the filters for radon progeny measurements were not preserved. During the period of dismantlement, 89 working level measurements were collected. The data sets and a graphic representation of the data are presented in Appendix H and Figure H.7.

5.0 WORK AREA GAMMA SURVEYS

5.1 GENERAL

Exposure rate measurements (μR/hr) were made with gamma scintillation detectors. The count rate in one tenth of a minute from the scintillometer, either an Eberline ESP-1 and Eberline SPA-3 or a Ludlum-2220 and Ludlum 43-10, was correlated to micro-roentgens per hour by comparison to a Reuter Stokes RS-111 Pressurized Ionization Chamber (PIC).

At the Lansdowne site, criteria were established for use of containment, tarpaulins, and open air dismantlement. The criteria were developed based on project experience and airborne radioactivity measurement results for specific demolition activities on material of known radioactive content. Owing to the unknowns which could have been encountered, the values used were biased on the conservative side. The criteria established were:

Containment	
Containment structure using minimum 6 mil polyethylene, HEPA ventilation, respiratory protection,	100 or greater microroentgen per hour
Weather Cover (tarpaulin)	
tarpaulin cover, HEPA ventilation, respiratory protection,	50 to 99 microroentgen per hour
Open Air Dismantlement	
Respiratory protection	less than 50 microroentgen per hour

Naturally, the criteria were tempered by viewing the work area as a whole. For example, in cases where the general gamma exposure rate was greater than 100 micro-roentgens per hour and localized areas were less than 50 micro-roentgens per hour, the more restrictive criteria was applied.

Over the course of the dismantlement, 712 measurements were made on the interior and exterior of the 105 structure, and 106 measurements were performed on the interior and exterior of the 107 structure. The difference in the number of measurements made in the two structures is a result of the higher contamination level in the structure at 105 East Stratford. A summary of the data for the two structures is presented in Tables 5.1 and 5.2 below.

TABLE 5.1

105 EAST STRATFORD AVENUE GAMMA SURVEYS

DATE	LOCATION	μR/hr MIN.	μR/hr MAX.	# READINGS
Aug 23, 1988	basement	50.4	211	20
	first floor	56.3	211	36
	second floor	80.1	200.8	41
	third floor	49.6	93.3	20
Sep 17, 1988	first floor	49.2	294.2	32
Sep 17, 1988	basement	49.5	850.8	32
Oct 4, 1988	first floor	108.1	463.9	22
Oct 24, 1988	basement	45.5	1013.2	15
	first floor	23.0	105.8	10
	second floor	21.0	51.3	10
Oct 31, 1988	first floor	179	831	19
Nov 2, 1988	first floor	46.1	226.1	20
Nov 3, 1988	first floor	64.6	169.5	2
Nov 7, 1988	second floor north roof	45.9	79.3	21
Nov 7, 1988	second floor south roof	29.4	49.5	55
Nov 8, 1988	first floor	31.1	406.7	160
Nov 9, 1988	south porch (interior)	30.6	225.7	105
Nov 11,	south porch	35.0	70.0	25

TABLE 5.1 (continued)

105 EAST STRATFORD AVENUE GAMMA SURVEYS

DATE	LOCATION	μR/hr MIN.	μR/hr MAX.	# READINGS
1988	(exterior)			
Nov 12, 1988	first floor	68.1	934.1	35
Dec 20, 1988	north porch	29.5	163.5	35

TABLE 5.2

107 EAST STRATFORD AVENUE GAMMA SURVEYS

DATE	LOCATION	μR/hr MIN.	μR/hr MAX.	# READINGS
Sep 20, 1988	chimney	10.2	13.3	6
Oct 24, 1988	basement	18.5	196.2	22
	first floor	23.0	70.0	15
	second floor	21.5	51.3	12
Nov 7, 1988	second floor south roof	15.6	25.5	30
Nov 7, 1988	second floor north roof	31.5	61.1	21
Feb 24, 1989	porch	47.3	100.3	15

6.0 BETA GAMMA SURVEYS

6.1 GENERAL

During the course of the structural dismantlement, the criteria established in the Contractor's Quality Control Plan were used to define the rubble removed from the structure as either clean or contaminated. Material was defined as contaminated if it met one or more of the following: survey results greater than two standard deviations above background, the object had a surface which was painted or treated, or the object had inaccessible areas which could not be surveyed.

Due to the number of objects involved, it is not practical to reproduce a complete list of all the items surveyed. Therefore, the following table provides a summary of the ranges, greater than two standard deviations above

background, for the general material categories. Ludlum 177 and Ludlum 44-9 or comparable instruments were used to perform the surveys.

Table 6.1
Activity Ranges for Items
Removed During Dismantlement

Item removed	Range of Beta-Gamma Activity (readings in CPM)
Stone	100 to 5000
Wood	10 to 10000
Plaster	100 to 15000
Concrete	10 to 500
Steel	100 to 1000
Miscellaneous*	10 to 50000

* Miscellaneous includes such items as cloth, glass, plastic, etc.

7.0 SURVEYS FOR REMOVABLE ACTIVITY

7.1 GENERAL

Prior to, during, and after dismantlement operations were completed, surveys for removable activity were performed by wiping an area of 100 square centimeters with a cloth filter. The surveys were performed to guide contamination control activities and provide general information regarding the contamination levels encountered during the project. The filters were counted on the Eberline BC-4, which is a scaler with a proportional beta-gamma detector. A percentage of these were also counted for alpha activity using a Ludlum-2000 and a Ludlum 43-10 alpha scintillation detector.

7.2 105 EAST STRATFORD SURVEYS

A total of 600 removable activity measurements were made in the 105 East Stratford residence during the project. Of this total, 76 were collected in the basement, 255 were collected on the first floor, 131 were collected on the second floor, and 138 were collected on the third floor. The data generated from these surveys is summarized in Table 7.1 below.

TABLE 7.1
Removable Beta-Gamma Activity Measurements
105 East Stratford Residence

105 Basement

Date	dpm/100 cm2 Min.	dpm/100 cm2 Max.	# of Swipes
Sep 16, 1988	*	1600	6
Sep 17, 1988	*	11400	20
Oct 12, 1988	400	23800	10
Jan 31, 1989	*	27400	40

<u>105 First Floor</u>

Date	Min.	Max.	# of Swipes
Aug 19, 1988	*	*	10
Aug 31, 1988	*	1200	12
Sep 02, 1988	*	300	8
Sep 06, 1988	*	800	10
Sep 07, 1988	*	1500	20
Sep 09, 1988	*	1100	10
Sep 10, 1988	*	1000	10
Sep 15, 1988	*	3200	13
Sep 15, 1988	*	5400	14
Sep 17, 1988	800	13400	20
Oct 12, 1988	*	1400	10
Oct 19, 1988	*	1000	7
Oct 28, 1988	*	200	10
Nov 04, 1988	*	1200	10
Nov 11, 1988	*	400	10
Nov 15, 1988	400	12400	19
Nov 15, 1988	1200	2400	7
Nov 19, 1988	800	2200	40
Jan 10, 1989	1800	10400	40

105 Second Floor

Date	Min.	Max.	# of Swipes
Aug 31, 1988	*	3000	11
Sep 01, 1988	*	600	9
Sep 06, 1988	*	10000	5
Sep 06, 1988	*	4000	19
Sep 07, 1988	*	2400	20
Sep 09, 1988	*	300	10
Sep 10, 1988	200	600	10
Sep 15, 1988	*	200	7
Sep 17, 1988	200	44400	19
Oct 12, 1988	400	800	4
Oct 19, 1988	*	1000	4
Oct 28, 1988	*	800	5
Nov 04, 1988	200	1400	5
Nov 15, 1988	600	1400	3

* = no activity above background was detected

TABLE 7.1 (continued)
Removable Activity Measurements
105 East Stratford Residence

Date	dpm/100 cm2 Min.	dpm/100 cm2 Max.	# of Swipes
105 Third Floor			
Aug 20, 1988	*	*	15
Aug 31, 1988	400	3000	11
Sep 06, 1988	*	24900	14
Sep 06, 1988	*	25000	9
Sep 07, 1988	*	2000	20
Sep 15, 1988	*	1600	10
Sep 17, 1988	*	3200	20
Sep 21, 1988	*	1200	5
Oct 10, 1988	200	850	20
Oct 12, 1988	*	400	5
Oct 19, 1988	*	1000	4
Nov 15, 1988	400	700	5

* = no activity above background was detected

7.3 107 EAST STRATFORD SURVEYS

A total of 190 removable activity measurements were made in the 107 East Stratford residence, of which 50 were collected in the basement, 90 were collected on the first floor, 26 were collected on the second floor, and 24 were collected on the third floor. A summary of the survey data is presented in Table 7.2 below.

TABLE 7.2
Removable Beta-Gamma Activity Measurements
107 East Stratford Residence

Date	dpm/100 cm2 Min.	dpm/100 cm2 Max.	# of Swipes
107 Basement			
Sep 20, 1988	200	500	5
Oct 14, 1988	200	400	10
Oct 19, 1988	*	400	10
Jan 31, 1989	200	800	25
107 First Floor			
Sep 20, 1988	100	200	5
Sep 22, 1988	*	*	7
Sep 28, 1988	100	400	10

TABLE 7.2 (continued)
Removable Beta-Gamma Activity Measurements
107 East Stratford Residence

107 First Floor (cont.)

Date	Min. (dpm/100 cm2)	Max. (dpm/100 cm2)	# of Swipes
Oct 05, 1988	800	3300	10
Oct 14, 1988	*	1000	7
Oct 19, 1988	*	8000	6
Oct 28, 1988	*	200	10
Nov 04, 1988	*	1600	10
Nov 11, 1988	*	1000	25

107 Second Floor

Date	Min.	Max.	# of Swipes
Sep 20, 1988	200	500	5
Sep 22, 1988	*	*	1
Sep 28, 1988	100	800	10
Oct 14, 1988	200	200	1
Oct 19, 1988	200	200	2
Oct 28, 1988	*	200	5
Nov 04, 1988	600	600	2

107 Third Floor

Date	Min.	Max.	# of Swipes
Sep 20, 1988	200	1200	5
Sep 22, 1988	*	*	10
Sep 28, 1988	100	400	5
Oct 14, 1988	200	200	2
Oct 19, 1988	*	*	2

* = no activity above background was detected

8.0 PHASE HAZARD ANALYSIS

Prior to beginning each new task in a job phase, a Phase Hazard Analysis was written, reviewed, and approved. A Phase Hazard Analysis is a document which contains not only a list of the appropriate safety apparel and equipment for the job, but also a general work instruction. This document was verbally discussed with the personnel who were to be involved in the specific job phase. Upon completion of the verbal discussion, each worker was given the opportunity to read the document, which they then signed to confirm their understanding of its contents. A summary of the Phase Hazard Analyses used during the structural dismantlement is provided as Appendix I of this document.

9.0 TOOL BOX SAFETY DISCUSSION

At the close of each work week all site personnel participated in a safety discussion. Safety issues of the week were recapped, and a general outline of the next week's activities was presented. This safety meeting was an interactive meeting between management and labor. A summary of the general topics covered at these meetings during the structural dismantlement is provided in Appendix I of this document.

APPENDIX 4-A

OCCUPATIONAL AIR SAMPLES

APPENDIX 4-A

OCCUPATIONAL AIR SAMPLES

PHASE: DISMANTLEMENT OF PRIMARY STRUCTURE

1.0 GENERAL

This appendix contains the data sets for the occupational air sampling program. Shown below is the a key to identify the types of measurements made.

AIR SAMPLE ID

L D - H V O - 0 0 0 1 - 0 1 - W L

OBJECT BEING DISMANTLED
WL = WALL
CE = CEILING
HI = CHIMNEY
SA = LSA BOX
OT = OTHER

LEVEL OF STRUCTURE
00 = BASEMENT
01 = FIRST FLOOR
02 = SECOND FLOOR
03 = THIRD FLOOR

UNIQUE SEQUENTIAL SAMPLE IDENTIFIER

TYPE OF AIR SAMPLE COLLECTED
HVO = HIGH VOLUME OCCUPATIONAL
APO = AIR PARTICULATE OCCUPATIONAL
LPO = LAPEL OCCUPATIONAL
WLO = WORKING LEVEL OCCUPATIONAL

PROJECT SITE
LD = LANSDOWNE, PA

LOCATION CODE

1 1 5

STRUCTURE WHERE
SAMPLE WAS COLLECTED
5 = 105 E. STRATFORD SIDE
7 = 107 E. STRATFORD SIDE

LEVEL OF STRUCTURE
WHERE SAMPLE WAS COLLECTED
0 = BASEMENT
1 = FIRST FLOOR
2 = SECOND FLOOR
3 = THIRD FLOOR

GENERAL LOCATION
1 = HOUSE
2 = CONTAINMENT

LANSDOWNE OCCUPATIONAL AIR CONCENTRATION DATA

Sample ID	Location	Samp In	Samp Out	Alpha(μCi/ml)
LD-HVO-0001-03-OT	135	18-Aug-88	18-Aug-88	5.46E-13
LD-HVO-0002-02-OT	125	19-Aug-88	19-Aug-88	-2.05E-13
LD-HVO-0003-01-OT	115	19-Aug-88	19-Aug-88	-2.56E-14
LD-HVO-0004-02-OT	125	19-Aug-88	19-Aug-88	1.54E-13
LD-HVO-0005-01-OT	115	20-Aug-88	20-Aug-88	-5.12E-14
LD-HVO-0008-01-OT	115	20-Aug-88	20-Aug-88	1.02E-13
LD-HVO-0009-01-OT	115	21-Aug-88	21-Aug-88	3.58E-13
LD-HVO-0010-03-OT	135	22-Aug-88	22-Aug-88	-3.21E-14
LD-HVO-0011-03-OT	135	23-Aug-88	23-Aug-88	1.79E-13
LD-HVO-0014-03-OT	135	23-Aug-88	23-Aug-88	7.68E-14

Avg./Phase: 1.10E-13 μCi/ml

Phase description: construction of containment

LD-HVO-0012-00-OT	105	23-Aug-88	23-Aug-88	3.58E-13
LD-HVO-0013-01-OT	115	23-Aug-88	23-Aug-88	1.54E-14
LD-HVO-0016-01-OT	115	24-Aug-88	24-Aug-88	2.57E-13
LD-HVO-0015-03-OT	135	24-Aug-88	24-Aug-88	4.50E-13
LD-HVO-0017-00-OT	105	24-Aug-88	24-Aug-88	6.43E-13
LD-HVO-0018-03-OT	135	25-Aug-88	25-Aug-88	1.02E-12
LD-HVO-0019-01-OT	115	25-Aug-88	25-Aug-88	3.86E-13
LD-HVO-0020-00-OT	105	25-Aug-88	25-Aug-88	5.85E-12
LD-HVO-0021-03-OT	135	26-Aug-88	26-Aug-88	5.78E-13
LD-HVO-0022-01-OT	115	26-Aug-88	26-Aug-88	2.25E-13
LD-HVO-0027-00-OT	105	29-Aug-88	29-Aug-88	4.50E-13

Avg./Phase: 9.30E-13 μCi/ml

Phase description: clean up 105 interior

LD-HVO-0025-02-OT	125	29-Aug-88	29-Aug-88	3.86E-13
LD-HVO-0024-03-OT	135	29-Aug-88	29-Aug-88	6.38E-13
LD-HVO-0026-01-OT	115	29-Aug-88	29-Aug-88	1.61E-12
LD-HVO-0023-01-OT	115	29-Aug-88	29-Aug-88	1.09E-12
LD-HVO-0028-03-WL	135	30-Aug-88	30-Aug-88	2.85E-11
LD-HVO-0032-02-HI	125	31-Aug-88	31-Aug-88	3.86E-11
LD-HVO-0030-02-OT	125	31-Aug-88	31-Aug-88	1.14E-11
LD-HVO-0033-03-HI	135	31-Aug-88	31-Aug-88	5.35E-11
LD-HVO-0035-02-HI	125	31-Aug-88	31-Aug-88	9.98E-13
LD-HVO-0029-03-WL	135	31-Aug-88	31-Aug-88	1.11E-11
LD-HVO-0031-03-HI	135	31-Aug-88	31-Aug-88	2.13E-11
LD-HVO-0034-03-HI	135	31-Aug-88	31-Aug-88	3.17E-11
LD-HVO-0038-03-WL	135	1-Sep-88	1-Sep-88	5.32E-12
LD-HVO-0039-03-WL	135	1-Sep-88	1-Sep-88	1.07E-13
LD-HVO-0040-02-OT	125	1-Sep-88	1-Sep-88	8.54E-14
LD-HVO-0041-01-SA	115	1-Sep-88	1-Sep-88	1.98E-13

Sample ID	Location	Samp In	Samp Out	Alpha(µCi/ml)
LD-HVO-0036-02-HI	125	1-Sep-88	1-Sep-88	2.96E-11
LD-HVO-0037-03-HI	135	1-Sep-88	1-Sep-88	3.54E-12
LD-HVO-0043-01-OT	115	2-Sep-88	2-Sep-88	1.48E-11
LD-HVO-0042-03-OT	135	2-Sep-88	2-Sep-88	1.42E-13
LD-HVO-0044-03-OT	135	6-Sep-88	6-Sep-88	4.30E-12
LD-HVO-0045-01-OT	115	6-Sep-88	6-Sep-88	1.30E-11
LD-HVO-0046-01-OT	115	6-Sep-88	6-Sep-88	8.70E-11
LD-HVO-0047-02-HI	125	7-Sep-88	7-Sep-88	2.08E-11
LD-HVO-0049-02-HI	125	7-Sep-88	7-Sep-88	5.31E-11
LD-HVO-0051-03-OT	135	7-Sep-88	7-Sep-88	2.75E-12
LD-HVO-0048-03-HI	135	7-Sep-88	7-Sep-88	1.27E-11
LD-HVO-0050-02-OT	125	7-Sep-88	7-Sep-88	7.97E-12
LD-HVO-0058-02-CE	125	8-Sep-88	8-Sep-88	4.43E-11
LD-HVO-0053-02-OT	125	8-Sep-88	8-Sep-88	1.00E-10
LD-HVO-0054-02-OT	125	8-Sep-88	8-Sep-88	1.70E-11
LD-HVO-0059-02-CE	125	8-Sep-88	8-Sep-88	4.28E-12
LD-HVO-0056-02-WL	125	8-Sep-88	8-Sep-88	3.46E-11
LD-HVO-0052-03-WL	135	8-Sep-88	8-Sep-88	4.73E-11
LD-HVO-0055-02-OT	125	8-Sep-88	8-Sep-88	1.95E-11
LD-HVO-0057-02-CE	125	8-Sep-88	8-Sep-88	3.72E-11
LD-HVO-0060-02-OT	125	9-Sep-88	9-Sep-88	1.80E-11
LD-HVO-0062-02-CE	125	9-Sep-88	9-Sep-88	1.77E-10
LD-HVO-0061-02-HI	125	9-Sep-88	9-Sep-88	7.85E-11
LD-HVO-0065-02-OT	125	10-Sep-88	10-Sep-88	3.53E-11
LD-HVO-0070-02-HI	125	10-Sep-88	10-Sep-88	1.87E-12
LD-HVO-0069-02-HI	125	10-Sep-88	10-Sep-88	5.68E-12
LD-HVO-0066-02-OT	125	10-Sep-88	10-Sep-88	2.10E-11
LD-HVO-0068-02-HI	125	10-Sep-88	10-Sep-88	9.06E-12
LD-HVO-0067-02-HI	125	10-Sep-88	10-Sep-88	3.02E-11
LD-HVO-0064-02-HI	125	10-Sep-88	10-Sep-88	3.84E-11
LD-HVO-0071-02-WL	125	12-Sep-88	12-Sep-88	1.25E-11
LD-HVO-0072-01-HI	115	13-Sep-88	13-Sep-88	1.68E-10
LD-APO-0076-01-WL	115	14-Sep-88	14-Sep-88	2.10E-11
LD-HVO-0077-01-WL	115	14-Sep-88	14-Sep-88	3.50E-10
LD-HVO-0082-01-HI	115	15-Sep-88	15-Sep-88	1.30E-10
LD-HVO-0079-01-WL	115	15-Sep-88	15-Sep-88	5.07E-10
LD-HVO-0078-01-WL	115	15-Sep-88	15-Sep-88	7.73E-10
LD-HVO-0084-01-WL	115	15-Sep-88	15-Sep-88	5.56E-11
LD-HVO-0080-03-OT	135	15-Sep-88	15-Sep-88	1.80E-10
LD-HVO-0086-01-OT	115	16-Sep-88	16-Sep-88	1.62E-10
LD-HVO-0090-00-OT	105	16-Sep-88	16-Sep-88	5.07E-11
LD-HVO-0091-00-OT	105	16-Sep-88	16-Sep-88	1.81E-11
LD-HVO-0088-00-OT	105	16-Sep-88	16-Sep-88	8.77E-11
LD-HVO-0085-01-WL	115	16-Sep-88	16-Sep-88	7.65E-10
LD-HVO-0087-01-OT	115	16-Sep-88	16-Sep-88	3.20E-10
LD-HVO-0089-00-OT	105	16-Sep-88	16-Sep-88	1.04E-11
LD-HVO-0092-01-WL	115	17-Sep-88	17-Sep-88	5.18E-11

Avg./Phase: 7.68E-11μCi/ml
Phase description: dismantlement of interior 105

Sample ID	Location	Samp In	Samp Out	Alpha(μCi/ml)
LD-HVO-0094-01-HI	117	19-Sep-88	19-Sep-88	-1.44E-13
LD-HVO-0095-01-OT	117	19-Sep-88	19-Sep-88	2.10E-12

Avg./Phase: 9.78E-13 μCi/ml
Phase description: clean-up of 107 interior

LD-HVO-0093-01-WL	115	19-Sep-88	19-Sep-88	2.85E-10
LD-HVO-0096-03-OT	137	19-Sep-88	19-Sep-88	7.04E-12
LD-HVO-0099-01-OT	117	20-Sep-88	20-Sep-88	1.02E-11
LD-HVO-0102-03-OT	137	20-Sep-88	20-Sep-88	1.20E-12
LD-HVO-0101-03-OT	137	20-Sep-88	20-Sep-88	1.88E-11
LD-HVO-0100-03-OT	137	20-Sep-88	20-Sep-88	3.75E-12
LD-HVO-0098-01-OT	117	20-Sep-88	20-Sep-88	-9.61E-14
LD-HVO-0104-03-WL	137	21-Sep-88	21-Sep-88	2.34E-11
LD-HVO-0103-03-OT	137	21-Sep-88	21-Sep-88	2.42E-12
LD-HVO-0102-01-OT	117	21-Sep-88	21-Sep-88	1.28E-11
LD-HVO-0105-03-HI	137	21-Sep-88	21-Sep-88	3.84E-13
LD-HVO-0106-03-WL	137	21-Sep-88	21-Sep-88	8.11E-12
LD-HVO-0110-03-OT	137	22-Sep-88	22-Sep-88	3.74E-11
LD-HVO-0109-03-WL	137	22-Sep-88	22-Sep-88	3.04E-11
LD-HVO-0111-03-HI	137	23-Sep-88	23-Sep-88	9.33E-14
LD-HVO-0116-03-OT	137	23-Sep-88	23-Sep-88	2.16E-12
LD-HVO-0113-02-WL	127	23-Sep-88	23-Sep-88	9.09E-12
LD-HVO-0117-02-WL	127	23-Sep-88	23-Sep-88	1.26E-11
LD-HVO-0118-02-WL	127	24-Sep-88	24-Sep-88	3.69E-11
LD-HVO-0121-02-WL	127	24-Sep-88	24-Sep-88	9.89E-12
LD-HVO-0120-02-WL	127	24-Sep-88	24-Sep-88	1.14E-11
LD-HVO-0119-02-OT	127	24-Sep-88	24-Sep-88	2.37E-11
LD-HVO-0122-02-WL	127	25-Sep-88	25-Sep-88	1.58E-10
LD-HVO-0124-01-WL	117	26-Sep-88	26-Sep-88	1.25E-11
LD-HVO-0125-02-WL	127	26-Sep-88	26-Sep-88	4.64E-12
LD-HVO-0123-02-WL	127	26-Sep-88	26-Sep-88	1.90E-11
LD-HVO-0126-02-CE	127	27-Sep-88	27-Sep-88	1.05E-11
LD-HVO-0127-02-CE	127	27-Sep-88	27-Sep-88	2.02E-12
LD-HVO-0129-02-CE	127	27-Sep-88	27-Sep-88	2.88E-13
LD-HVO-0128-02-CE	127	27-Sep-88	27-Sep-88	5.28E-13
LD-HVO-0130-02-CE	127	28-Sep-88	28-Sep-88	5.04E-12
LD-HVO-0133-01-HI	117	28-Sep-88	28-Sep-88	3.86E-11
LD-HVO-0132-01-HI	117	28-Sep-88	28-Sep-88	3.31E-10
LD-HVO-0135-01-CE	117	28-Sep-88	28-Sep-88	3.97E-11
LD-HVO-0134-01-OT	117	28-Sep-88	28-Sep-88	5.74E-13
LD-HVO-0137-01-WL	117	29-Sep-88	29-Sep-88	1.68E-10
LD-HVO-0136-01-CE	117	29-Sep-88	29-Sep-88	1.55E-10

Sample ID	Location	Samp In	Samp Out	Alpha(μCi/ml)
LD-HVO-0138-01-WL	117	29-Sep-88	29-Sep-88	5.15E-11
LD-HVO-0141-01-SA	105	30-Sep-88	30-Sep-88	2.25E-10
LD-HVO-0140-00-OT	107	30-Sep-88	30-Sep-88	1.49E-12
LD-HVO-0139-00-OT	107	30-Sep-88	30-Sep-88	5.51E-11

Avg./Phase: 4.45E-11 μCi/ml

Phase description: dismantlement 107 interior

LD-APO-0723-01-OT	117	3-Oct-88	3-Oct-88	3.40E-14
LD-HVO-0146-00-OT	107	4-Oct-88	4-Oct-88	5.30E-11
LD-HVO-0148-00-OT	105	5-Oct-88	5-Oct-88	1.67E-12
LD-HVO-0147-00-OT	107	5-Oct-88	5-Oct-88	1.45E-11
LD-APO-0724-01-OT	117	6-Oct-88	6-Oct-88	1.20E-13
LD-APO-0725-01-OT	117	8-Oct-88	8-Oct-88	3.50E-14

Avg./Phase: 1.16E-11 μCi/ml

Phase description: preparations for exterior dismantlement 105

LD-LPO-0170-03-CE	135	10-Oct-88	10-Oct-88	4.12E-12
LD-HVO-0163-03-OT	135	10-Oct-88	10-Oct-88	3.39E-12
LD-HVO-0166-03-CE	135	10-Oct-88	10-Oct-88	9.46E-12
LD-HVO-0164-03-CE	135	10-Oct-88	10-Oct-88	3.55E-12
LD-HVO-0168-03-CE	135	10-Oct-88	10-Oct-88	2.84E-11
LD-HVO-0169-03-CE	135	10-Oct-88	10-Oct-88	2.07E-11
LD-HVO-0167-03-CE	135	10-Oct-88	10-Oct-88	9.95E-12
LD-HVO-0165-03-CE	135	10-Oct-88	10-Oct-88	4.65E-12
LD-HVO-0171-03-CE	135	11-Oct-88	11-Oct-88	9.12E-12
LD-HVO-0178-03-CE	135	11-Oct-88	11-Oct-88	6.46E-11
LD-HVO-0174-03-CE	135	11-Oct-88	11-Oct-88	1.19E-11
LD-HVO-0177-03-CE	135	11-Oct-88	11-Oct-88	2.58E-11
LD-HVO-0172-03-CE	135	11-Oct-88	11-Oct-88	6.57E-12
LD-HVO-0175-03-CE	135	11-Oct-88	11-Oct-88	5.83E-12
LD-HVO-0176-03-CE	135	11-Oct-88	11-Oct-88	5.09E-11
LD-HVO-0182-03-WL	135	12-Oct-88	12-Oct-88	1.43E-11
LD-HVO-0181-03-WL	135	12-Oct-88	12-Oct-88	7.49E-12
LD-HVO-0179-03-WL	135	12-Oct-88	12-Oct-88	7.54E-12
LD-APO-0191-03-CE	135	12-Oct-88	13-Oct-88	2.40E-12
LD-HVO-0189-03-WL	135	13-Oct-88	13-Oct-88	1.58E-10
LD-HVO-0184-03-WL	135	13-Oct-88	13-Oct-88	2.20E-11
LD-APO-0192-03-WL	135	13-Oct-88	14-Oct-88	7.51E-13
LD-HVO-0190-03-OT	135	13-Oct-88	13-Oct-88	1.36E-11
LD-HVO-0183-03-WL	135	13-Oct-88	13-Oct-88	2.17E-12
LD-HVO-0186-03-WL	135	13-Oct-88	13-Oct-88	8.97E-11
LD-APO-0196-03-OT	135	13-Oct-88	14-Oct-88	7.87E-13
LD-HVO-0185-03-WL	135	13-Oct-88	13-Oct-88	2.46E-11
LD-HVO-0187-03-WL	135	13-Oct-88	13-Oct-88	6.51E-12
LD-HVO-0188-03-WL	135	13-Oct-88	13-Oct-88	2.73E-10

Sample ID	Location	Samp In	Samp Out	Alpha(μCi/ml)
LD-LPO-0200-03-CE	135	14-Oct-88	14-Oct-88	2.09E-12
LD-HVO-0194-03-WL	135	14-Oct-88	14-Oct-88	5.41E-12
LD-HVO-0193-03-WL	135	14-Oct-88	14-Oct-88	1.12E-10
LD-HVO-0195-01-OT	115	14-Oct-88	14-Oct-88	1.64E-11

Avg./Phase: 3.08E-11 μCi/ml

Phase description: exterior dismantlement 3rd floor 105

Sample ID	Location	Samp In	Samp Out	Alpha(μCi/ml)
LD-HVO-0197-03-CE	137	14-Oct-88	14-Oct-88	2.92E-12
LD-HVO-0199-03-CE	137	14-Oct-88	14-Oct-88	4.66E-12
LD-HVO-0198-03-CE	137	14-Oct-88	14-Oct-88	4.66E-12
LD-HVO-0201-03-CE	137	15-Oct-88	15-Oct-88	3.28E-11
LD-HVO-0202-03-CE	137	15-Oct-88	15-Oct-88	7.69E-12
LD-HVO-0206-03-CE	137	15-Oct-88	15-Oct-88	4.62E-12
LD-HVO-0205-03-CE	137	15-Oct-88	15-Oct-88	6.30E-12
LD-HVO-0203-03-CE	137	15-Oct-88	15-Oct-88	2.29E-12
LD-HVO-0207-03-CE	137	15-Oct-88	15-Oct-88	4.19E-13
LD-HVO-0204-03-CE	137	15-Oct-88	15-Oct-88	1.45E-11
LD-HVO-0208-03-OT	107	16-Oct-88	17-Oct-88	1.82E-13
LD-APO-0225-03-OT	137	17-Oct-88	18-Oct-88	1.05E-13
LD-HVO-0216-03-CE	137	17-Oct-88	17-Oct-88	9.78E-12
LD-HVO-0215-03-WL	137	17-Oct-88	17-Oct-88	4.48E-12
LD-HVO-0208-03-CE	137	17-Oct-88	17-Oct-88	7.64E-12
LD-HVO-0214-03-WL	137	17-Oct-88	17-Oct-88	1.51E-11
LD-HVO-0213-03-WL	137	17-Oct-88	17-Oct-88	6.30E-13
LD-HVO-0211-03-WL	137	17-Oct-88	17-Oct-88	4.71E-12
LD-HVO-0209-02-OT	127	17-Oct-88	17-Oct-88	2.65E-12
LD-HVO-0210-03-CE	137	17-Oct-88	17-Oct-88	1.25E-12
LD-HVO-0212-03-WL	137	17-Oct-88	17-Oct-88	2.42E-11
LD-APO-0216-03-CE	107	17-Oct-88	17-Oct-88	1.45E-12
LD-LPO-0224-03-OT	137	18-Oct-88	18-Oct-88	1.29E-12
LD-HVO-0221-03-CE	137	18-Oct-88	18-Oct-88	3.45E-12
LD-HVO-0227-03-OT	137	18-Oct-88	19-Oct-88	6.13E-13
LD-HVO-0220-03-CE	137	18-Oct-88	18-Oct-88	2.83E-11
LD-HVO-0219-03-CE	137	18-Oct-88	18-Oct-88	4.12E-12
LD-HVO-0218-01-OT	117	18-Oct-88	18-Oct-88	2.63E-12
LD-HVO-0224-02-OT	127	18-Oct-88	18-Oct-88	2.33E-12
LD-HVO-0222-03-CE	137	18-Oct-88	18-Oct-88	3.31E-12
LD-HVO-0223-01-OT	117	18-Oct-88	18-Oct-88	2.33E-12
LD-HVO-0217-03-CE	137	18-Oct-88	18-Oct-88	9.39E-12
LD-HVO-0231-03-WL	137	19-Oct-88	19-Oct-88	5.76E-12
LD-HVO-0229-01-OT	117	19-Oct-88	19-Oct-88	1.29E-12
LD-HVO-0228-01-OT	117	19-Oct-88	19-Oct-88	2.49E-12
LD-HVO-0230-03-CE	137	19-Oct-88	19-Oct-88	1.10E-11
LD-HVO-0233-03-WL	137	20-Oct-88	20-Oct-88	2.59E-12
LD-HVO-0237-03-WL	137	20-Oct-88	20-Oct-88	2.16E-12
LD-HVO-0238-03-WL	137	20-Oct-88	20-Oct-88	4.71E-12
LD-APO-0240-03-OT	137	20-Oct-88	20-Oct-88	3.45E-12

Sample ID	Location	Samp In	Samp Out	Alpha(μCi/ml)
LD-LPO-0241-03-WL	137	20-Oct-88	20-Oct-88	5.04E-12
LD-HVO-0234-03-WL	137	20-Oct-88	20-Oct-88	1.20E-12
LD-HVO-0232-03-WL	137	20-Oct-88	20-Oct-88	1.49E-12
LD-HVO-0239-13-OT	107	20-Oct-88	20-Oct-88	2.21E-10
LD-HVO-0236-01-OT	117	20-Oct-88	20-Oct-88	1.34E-12
LD-HVO-0246-03-WL	137	21-Oct-88	21-Oct-88	6.06E-12
LD-HVO-0247-03-WL	137	21-Oct-88	21-Oct-88	1.01E-12
LD-LPO-0249-03-WL	137	21-Oct-88	21-Oct-88	3.15E-12
LD-HVO-0242-03-WL	137	21-Oct-88	21-Oct-88	3.45E-12
LD-APO-0248-03-OT	137	21-Oct-88	21-Oct-88	1.34E-13
LD-HVO-0243-01-OT	117	21-Oct-88	21-Oct-88	1.81E-12
LD-HVO-0244-03-WL	137	21-Oct-88	21-Oct-88	1.30E-12
LD-HVO-0252-01-OT	117	22-Oct-88	22-Oct-88	2.63E-12
LD-LPO-0254-03-CE	137	22-Oct-88	22-Oct-88	1.23E-11
LD-APO-0263-23-OT	107	22-Oct-88	24-Oct-88	7.58E-14

Avg./Phase: 9.20E-12 μCi/ml
Phase description: exterior dismantlement 3rd floor 107

Sample ID	Location	Samp In	Samp Out	Alpha(μCi/ml)
LD-HVO-0251-03-CE	135	22-Oct-88	22-Oct-88	1.52E-11
LD-HVO-0250-03-CE	137	22-Oct-88	22-Oct-88	2.57E-12
LD-APO-0255-03-OT	137	22-Oct-88	23-Oct-88	1.05E-12
LD-HVO-0258-02-CE	137	24-Oct-88	24-Oct-88	6.92E-11
LD-LPO-0263-23-OT	107	24-Oct-88	24-Oct-88	1.07E-11
LD-HVO-0260-02-WL	127	24-Oct-88	24-Oct-88	1.94E-12
LD-HVO-0259-01-OT	117	24-Oct-88	24-Oct-88	8.03E-11
LD-HVO-0257-01-OT	137	24-Oct-88	24-Oct-88	5.24E-13
LD-HVO-0261-02-WL	127	24-Oct-88	24-Oct-88	5.68E-12
LD-HVO-0256-03-CE	137	24-Oct-88	24-Oct-88	5.35E-13
LD-LPO-0272-02-WL	127	25-Oct-88	25-Oct-88	2.13E-11
LD-HVO-0269-02-OT	127	25-Oct-88	25-Oct-88	5.25E-11
LD-HVO-0268-02-WL	127	25-Oct-88	25-Oct-88	1.42E-11
LD-HVO-0265-01-OT	117	25-Oct-88	25-Oct-88	5.09E-12
LD-HVO-0266-02-WL	127	25-Oct-88	25-Oct-88	4.28E-12
LD-HVO-0270-02-WL	127	25-Oct-88	25-Oct-88	3.91E-11
LD-HVO-0271-02-WL	127	25-Oct-88	25-Oct-88	4.36E-12
LD-APO-0273-02-WL	127	25-Oct-88	26-Oct-88	2.30E-13
LD-HVO-0264-02-WL	127	25-Oct-88	25-Oct-88	3.77E-11
LD-HVO-0277-02-OT	127	26-Oct-88	26-Oct-88	5.96E-12
LD-HVO-0281-02-WL	127	26-Oct-88	26-Oct-88	2.19E-12
LD-HVO-0275-02-CE	127	26-Oct-88	26-Oct-88	1.14E-11
LD-LPO-0274-02-WL	127	26-Oct-88	26-Oct-88	3.76E-12
LD-HVO-0278-01-OT	117	26-Oct-88	26-Oct-88	2.53E-11
LD-HVO-0276-01-OT	117	26-Oct-88	26-Oct-88	1.58E-12
LD-HVO-0279-02-OT	127	26-Oct-88	26-Oct-88	2.29E-12
LD-APO-0291-23-OT	107	26-Oct-88	27-Oct-88	1.66E-12
LD-HVO-0283-01-OT	117	27-Oct-88	27-Oct-88	2.47E-12
LD-HVO-0289-02-WL	127	27-Oct-88	27-Oct-88	3.62E-11

Sample ID	Location	Samp In	Samp Out	Alpha(μCi/ml)
LD-HVO-0284-01-OT	117	27-Oct-88	27-Oct-88	1.68E-12
LD-HVO-0288-01-OT	117	27-Oct-88	27-Oct-88	2.05E-12
LD-HVO-0285-02-WL	127	27-Oct-88	27-Oct-88	4.85E-12
LD-HVO-0286-02-WL	127	27-Oct-88	27-Oct-88	3.26E-12
LD-HVO-0287-02-WL	127	27-Oct-88	27-Oct-88	1.84E-11
LD-APO-0296-23-OT	105	27-Oct-88	28-Oct-88	3.88E-11
LD-HVO-0290-02-HI	127	27-Oct-88	27-Oct-88	6.06E-12
LD-LPO-0292-02-WL	127	27-Oct-88	27-Oct-88	4.34E-12
LD-HVO-0294-02-WL	127	28-Oct-88	28-Oct-88	2.98E-12
LD-LPO-0295-02-WL	127	28-Oct-88	28-Oct-88	6.26E-11

Avg./Phase: 1.55E-11 μCi/ml

Phase description: exterior dismantlement 2nd floor 107

LD-APO-0303-23-OT	105	28-Oct-88	31-Oct-88	4.81E-14
LD-HVO-0297-02-CE	125	31-Oct-88	31-Oct-88	3.12E-12
LD-HVO-0301-02-WL	125	31-Oct-88	31-Oct-88	5.04E-12
LD-HVO-0299-02-CE	125	31-Oct-88	31-Oct-88	3.12E-12
LD-HVO-0298-02-CE	125	31-Oct-88	31-Oct-88	9.75E-12
LD-HVO-0302-02-WL	125	31-Oct-88	31-Oct-88	5.60E-11
LD-LPO-0304-02-WL	125	31-Oct-88	31-Oct-88	3.15E-12
LD-HVO-0300-02-CE	125	31-Oct-88	31-Oct-88	1.28E-11
LD-HVO-0307-02-WL	125	1-Nov-88	1-Nov-88	1.52E-11
LD-HVO-0306-01-OT	115	1-Nov-88	1-Nov-88	4.47E-12
LD-HVO-0305-02-WL	125	1-Nov-88	1-Nov-88	2.71E-12
LD-HVO-0309-01-OT	115	1-Nov-88	1-Nov-88	5.73E-11
LD-HVO-0311-02-WL	125	1-Nov-88	1-Nov-88	1.84E-12
LD-APO-0321-12-OT	105	1-Nov-88	2-Nov-88	3.51E-13
LD-HVO-0308-01-OT	115	1-Nov-88	1-Nov-88	6.16E-12
LD-APO-0310-12-OT	105	1-Nov-88	1-Nov-88	9.19E-12
LD-HVO-0314-23-WL	105	2-Nov-88	2-Nov-88	6.33E-11
LD-HVO-0315-23-WL	105	2-Nov-88	2-Nov-88	3.44E-10
LD-HVO-0316-02-WL	125	2-Nov-88	2-Nov-88	6.81E-11
LD-HVO-0312-23-WL	105	2-Nov-88	2-Nov-88	1.41E-11
LD-HVO-0317-02-WL	125	2-Nov-88	2-Nov-88	3.05E-11
LD-HVO-0318-01-OT	115	2-Nov-88	2-Nov-88	7.66E-11
LD-HVO-0313-23-WL	105	2-Nov-88	2-Nov-88	5.41E-12
LD-APO-0330-12-OT	105	2-Nov-88	3-Nov-88	2.82E-12
LD-LPO-0320-02-WL	125	2-Nov-88	2-Nov-88	1.00E-11
LD-HVO-0322-02-WL	125	3-Nov-88	3-Nov-88	2.59E-10
LD-HVO-0329-02-WL	125	3-Nov-88	3-Nov-88	1.50E-11
LD-HVO-0327-02-WL	125	3-Nov-88	3-Nov-88	1.02E-10
LD-HVO-0328-01-OT	115	3-Nov-88	3-Nov-88	3.23E-10
LD-HVO-0325-02-WL	125	3-Nov-88	3-Nov-88	3.89E-11
LD-LPO-0331-02-OT	125	3-Nov-88	3-Nov-88	1.59E-11
LD-HVO-0326-01-OT	115	3-Nov-88	3-Nov-88	6.96E-11
LD-HVO-0323-02-WL	125	3-Nov-88	3-Nov-88	1.54E-10
LD-HVO-0324-02-WL	125	3-Nov-88	3-Nov-88	4.18E-10

Sample ID	Location	Samp In	Samp Out	Alpha(μCi/ml)
LD-HVO-0335-02-WL	125	4-Nov-88	4-Nov-88	2.35E-11
LD-HVO-0334-02-WL	125	4-Nov-88	4-Nov-88	7.87E-11
LD-HVO-1334-01-OT	115	4-Nov-88	4-Nov-88	1.51E-10
LD-HVO-0336-02-WL	125	4-Nov-88	4-Nov-88	4.23E-12
LD-HVO-0332-02-WL	125	4-Nov-88	4-Nov-88	8.38E-11
LD-LPO-0338-01-WL	115	4-Nov-88	4-Nov-88	7.98E-12
LD-APO-0346-02-OT	125	4-Nov-88	5-Nov-88	3.26E-12
LD-HVO-0337-01-OT	115	4-Nov-88	4-Nov-88	6.83E-11
LD-HVO-0333-02-WL	125	4-Nov-88	4-Nov-88	1.58E-10
LD-HVO-0343-02-WL	125	5-Nov-88	5-Nov-88	7.54E-11
LD-HVO-0342-01-WL	115	5-Nov-88	5-Nov-88	4.75E-12
LD-HVO-0344-02-WL	125	5-Nov-88	5-Nov-88	4.08E-12
LD-APO-0355-01-OT	115	5-Nov-88	7-Nov-88	2.96E-13
LD-HVO-0340-01-OT	115	5-Nov-88	5-Nov-88	5.49E-11
LD-HVO-0342-02-WL	125	5-Nov-88	5-Nov-88	4.75E-12
LD-HVO-0341-01-OT	115	5-Nov-88	5-Nov-88	2.45E-11
LD-LPO-0345-02-OT	125	5-Nov-88	5-Nov-88	2.25E-12
LD-APO-0360-01-OT	115	7-Nov-88	8-Nov-88	5.20E-13
LD-HVO-0351-02-WL	125	7-Nov-88	7-Nov-88	1.62E-11
LD-HVO-0350-02-WL	125	7-Nov-88	7-Nov-88	3.01E-11
LD-HVO-0348-01-OT	115	7-Nov-88	7-Nov-88	2.24E-11
LD-HVO-0347-01-OT	115	7-Nov-88	7-Nov-88	2.36E-11
LD-HVO-0352-01-OT	115	7-Nov-88	7-Nov-88	8.77E-11
LD-HVO-0349-02-WL	125	7-Nov-88	7-Nov-88	1.28E-10
LD-HVO-0356-02-OT	125	8-Nov-88	8-Nov-88	7.33E-11
LD-HVO-0357-02-WL	125	8-Nov-88	8-Nov-88	1.04E-11
LD-APO-0371-01-OT	115	8-Nov-88	9-Nov-88	3.99E-13
LD-HVO-0358-01-CE	115	8-Nov-88	8-Nov-88	3.31E-12
LD-LPO-0361-01-OT	115	8-Nov-88	8-Nov-88	9.16E-13

Avg./Phase: 5.31E-11 μCi/ml

Phase description: exterior dismantlement 2nd floor 105

LD-HVO-0359-01-CE	117	8-Nov-88	8-Nov-88	1.84E-11
LD-APO-0386-01-OT	117	9-Nov-88	10-Nov-88	3.00E-12
LD-LPO-0387-01-CE	117	10-Nov-88	10-Nov-88	4.92E-12
LD-HVO-0383-01-WL	117	10-Nov-88	10-Nov-88	1.32E-11
LD-HVO-0381-01-OT	117	10-Nov-88	10-Nov-88	1.35E-12
LD-HVO-0376-01-SA	115	10-Nov-88	10-Nov-88	5.64E-12
LD-HVO-0380-01-WL	117	10-Nov-88	10-Nov-88	4.01E-12
LD-APO-0394-01-OT	115	10-Nov-88	11-Nov-88	1.09E-12
LD-HVO-0378-01-OT	117	10-Nov-88	10-Nov-88	8.24E-12
LD-HVO-0385-01-CE	117	10-Nov-88	10-Nov-88	2.74E-11
LD-HVO-0377-01-WL	117	10-Nov-88	10-Nov-88	2.21E-11
LD-HVO-0372-01-OT	117	10-Nov-88	10-Nov-88	2.01E-12
LD-HVO-0375-01-OT	117	10-Nov-88	10-Nov-88	1.35E-12
LD-HVO-0382-01-SA	115	10-Nov-88	10-Nov-88	6.20E-12
LD-HVO-0379-01-SA	115	10-Nov-88	10-Nov-88	4.99E-12

Sample ID	Location	Samp In	Samp Out	Alpha(μCi/ml)
LD-HVO-0384-01-CE	117	10-Nov-88	10-Nov-88	1.78E-11
LD-HVO-0373-01-WL	117	10-Nov-88	10-Nov-88	5.13E-12
LD-LPO-0395-01-OT	115	11-Nov-88	11-Nov-88	1.34E-11
LD-HVO-0388-01-WL	117	11-Nov-88	11-Nov-88	2.67E-12
LD-HVO-0389-01-WL	117	11-Nov-88	11-Nov-88	1.63E-11
LD-HVO-0390-01-OT	117	11-Nov-88	11-Nov-88	9.85E-12

Avg./Phase: 9.00E-12 μCi/ml

Phase description: exterior dismantlement porch and 1st floor 107

LD-HVO-0391-01-CE	115	11-Nov-88	11-Nov-88	3.24E-10
LD-HVO-0392-01-CE	115	11-Nov-88	11-Nov-88	9.80E-11
LD-HVO-0393-01-CE	115	11-Nov-88	11-Nov-88	1.45E-10
LD-APO-0410-01-OT	115	11-Nov-88	14-Nov-88	1.50E-12
LD-HVO-0396-01-WL	115	12-Nov-88	12-Nov-88	4.26E-10
LD-HVO-0397-01-WL	115	12-Nov-88	12-Nov-88	9.25E-10
LD-LPO-0398-01-WL	115	12-Nov-88	12-Nov-88	1.44E-11
LD-HVO-0407-01-OT	115	14-Nov-88	14-Nov-88	6.47E-11
LD-HVO-0403-01-CE	115	14-Nov-88	14-Nov-88	2.04E-11
LD-HVO-0402-01-CE	115	14-Nov-88	14-Nov-88	5.84E-12
LD-HVO-0405-01-CE	115	14-Nov-88	14-Nov-88	7.04E-12
LD-HVO-0400-01-CE	117	14-Nov-88	14-Nov-88	8.60E-13
LD-LPO-0409-01-OT	115	14-Nov-88	14-Nov-88	1.81E-11
LD-HVO-0399-01-CE	117	14-Nov-88	14-Nov-88	8.60E-13
LD-HVO-0406-01-OT	115	14-Nov-88	14-Nov-88	3.40E-11
LD-HVO-0404-01-CE	115	14-Nov-88	14-Nov-88	9.90E-12
LD-HVO-0408-01-CE	115	14-Nov-88	14-Nov-88	1.93E-11
LD-HVO-0401-01-CE	115	14-Nov-88	14-Nov-88	5.21E-12
LD-HVO-0415-01-WL	115	15-Nov-88	15-Nov-88	6.10E-11
LD-HVO-0411-01-SA	115	15-Nov-88	15-Nov-88	3.09E-12
LD-LPO-0416-01-WL	115	15-Nov-88	15-Nov-88	2.54E-11
LD-HVO-0412-01-SA	115	15-Nov-88	15-Nov-88	4.69E-12
LD-HVO-0414-01-HI	115	15-Nov-88	15-Nov-88	3.74E-10
LD-HVO-0413-01-SA	115	15-Nov-88	15-Nov-88	3.97E-11
LD-HVO-0420-01-WL	115	16-Nov-88	16-Nov-88	1.77E-11
LD-HVO-0422-01-WL	115	16-Nov-88	16-Nov-88	9.50E-11
LD-HVO-0417-01-WL	115	16-Nov-88	16-Nov-88	2.74E-10
LD-HVO-0418-01-WL	115	16-Nov-88	16-Nov-88	1.20E-10
LD-APO-0425-01-OT	115	16-Nov-88	16-Nov-88	7.56E-12
LD-HVO-0421-01-WL	115	16-Nov-88	16-Nov-88	1.21E-10
LD-LPO-0424-01-OT	115	16-Nov-88	16-Nov-88	1.69E-11
LD-HVO-0419-01-WL	115	16-Nov-88	16-Nov-88	1.20E-10
LD-HVO-0423-01-OT	115	16-Nov-88	16-Nov-88	1.32E-10
LD-HVO-0427-01-WL	115	17-Nov-88	17-Nov-88	1.41E-11
LD-HVO-0430-01-WL	115	17-Nov-88	17-Nov-88	1.01E-10
LD-HVO-0426-01-WL	115	17-Nov-88	17-Nov-88	1.36E-10
LD-LPO-0432-01-OT	115	17-Nov-88	17-Nov-88	1.00E-11

Sample ID	Location	Samp In	Samp Out	Alpha(µCi/ml)
LD-APO-0431-01-OT	115	17-Nov-88	17-Nov-88	4.69E-13
LD-HVO-0428-01-WL	115	17-Nov-88	17-Nov-88	8.43E-11
LD-HVO-0429-01-WL	115	17-Nov-88	17-Nov-88	1.64E-11
LD-HVO-0436-01-WL	115	18-Nov-88	18-Nov-88	1.45E-10
LD-HVO-0433-01-OT	115	18-Nov-88	18-Nov-88	3.64E-11
LD-APO-0437-01-OT	115	18-Nov-88	18-Nov-88	2.22E-13
LD-HVO-0435-01-WL	115	18-Nov-88	18-Nov-88	1.51E-10
LD-HVO-0434-01-WL	115	18-Nov-88	18-Nov-88	2.34E-11

Avg./Phase: Phase description:
9.45E-11 µCi/ml exterior dismantlement porch and 1st floor 105

Sample ID	Location	Samp In	Samp Out	Alpha(µCi/ml)
LD-APO-0709-01-OT	115	10-Jan-88	10-Jan-88	3.20E-13
LD-APO-0707-01-OT	115	10-Jan-88	10-Jan-88	3.70E-12
LD-APO-0706-01-OT	115	10-Jan-88	10-Jan-88	9.50E-13
LD-APO-0711-01-OT	115	10-Jan-88	10-Jan-88	9.90E-12
LD-APO-0704-01-OT	115	10-Jan-88	10-Jan-88	8.10E-13
LD-APO-0708-01-OT	115	10-Jan-88	10-Jan-88	4.10E-13
LD-APO-0710-01-OT	115	10-Jan-88	10-Jan-88	2.30E-11
LD-APO-0712-01-OT	115	10-Jan-88	10-Jan-88	2.40E-12
LD-APO-0703-01-OT	115	10-Jan-88	10-Jan-88	2.50E-12
LD-APO-0718-01-OT	117	11-Jan-88	11-Jan-88	9.10E-13
LD-APO-0717-01-OT	115	11-Jan-88	11-Jan-88	1.30E-12
LD-APO-0714-01-OT	115	11-Jan-88	11-Jan-88	5.40E-12
LD-APO-0715-01-OT	115	11-Jan-88	11-Jan-88	1.00E-11
LD-APO-0720-01-OT	117	11-Jan-88	11-Jan-88	2.40E-13
LD-APO-0716-01-OT	115	11-Jan-88	11-Jan-88	3.80E-12
LD-APO-0722-01-OT	117	11-Jan-88	11-Jan-88	6.00E-13
LD-APO-0721-01-OT	117	11-Jan-88	11-Jan-88	6.50E-13
LD-LPO-0713-01-OT	115	11-Jan-88	11-Jan-88	3.10E-13
LD-APO-0719-01-OT	117	11-Jan-88	11-Jan-88	3.80E-13

Avg./Phase: Phase description:
3.56E-12 µCi/ml exterior dismantlement 105 & 107 porch floors

Sample ID	Location	Samp In	Samp Out	Alpha(µCi/ml)
LD-LPO-0811-00-OT	107	1-Feb-88	1-Feb-88	1.40E-12
LD-APO-0809-00-WL	107	1-Feb-88	1-Feb-88	8.60E-13
LD-APO-0806-00-OT	107	1-Feb-88	1-Feb-88	3.90E-13
LD-APO-0808-00-WL	107	1-Feb-88	1-Feb-88	6.40E-13
LD-APO-0807-00-WL	107	1-Feb-88	1-Feb-88	8.60E-13
LD-APO-0810-00-WL	107	1-Feb-88	1-Feb-88	8.60E-13
LD-APO-0814-00-OT	107	2-Feb-88	2-Feb-88	1.89E-12
LD-APO-0819-00-WL	107	2-Feb-88	2-Feb-88	4.31E-12
LD-APO-0820-00-WL	107	2-Feb-88	2-Feb-88	9.82E-13
LD-APO-0815-00-CE	107	2-Feb-88	2-Feb-88	3.28E-13
LD-APO-0821-00-WL	107	2-Feb-88	2-Feb-88	5.72E-13

Sample ID	Location	Samp In	Samp Out	Alpha(μCi/ml)
LD-APO-0818-00-WL	107	2-Feb-88	2-Feb-88	4.98E-13
LD-APO-0816-00-CE	107	2-Feb-88	2-Feb-88	1.02E-13
LD-APO-0817-00-WL	107	2-Feb-88	2-Feb-88	2.17E-12
LD-LPO-0813-00-OT	107	2-Feb-88	2-Feb-88	7.94E-13
LD-APO-0824-00-WL	107	6-Feb-88	6-Feb-88	6.64E-14
LD-APO-0829-00-WL	107	6-Feb-88	6-Feb-88	3.32E-14
LD-APO-0825-00-WL	107	6-Feb-88	6-Feb-88	7.55E-14
LD-APO-0830-00-WL	107	6-Feb-88	6-Feb-88	7.10E-13
LD-APO-0827-00-WL	107	6-Feb-88	6-Feb-88	6.04E-14
LD-APO-0826-00-WL	107	6-Feb-88	6-Feb-88	3.32E-14
LD-APO-0828-00-WL	107	6-Feb-88	6-Feb-88	2.66E-13
LD-LPO-0822-00-OT	107	6-Feb-88	6-Feb-88	1.08E-12
LD-LPO-0839-00-OT	107	7-Feb-88	7-Feb-88	6.06E-12
LD-APO-0835-00-WL	107	7-Feb-88	7-Feb-88	3.04E-13
LD-LPO-0839-00-OT	107	7-Feb-88	7-Feb-88	6.06E-12
LD-APO-0834-00-WL	107	7-Feb-88	7-Feb-88	1.17E-13
LD-APO-0838-00-WL	107	7-Feb-88	7-Feb-88	2.77E-14
LD-APO-0833-00-WL	107	7-Feb-88	7-Feb-88	2.77E-14
LD-APO-0836-00-WL	107	7-Feb-88	7-Feb-88	1.38E-14
LD-APO-0837-00-WL	107	7-Feb-88	7-Feb-88	8.79E-14
LD-APO-0831-00-WL	107	7-Feb-88	7-Feb-88	1.38E-14
LD-APO-0832-00-WL	107	7-Feb-88	7-Feb-88	1.38E-14
LD-APO-0846-00-WL	107	8-Feb-88	8-Feb-88	1.28E-13
LD-APO-0841-00-WL	107	8-Feb-88	8-Feb-88	2.56E-13
LD-APO-0845-00-WL	107	8-Feb-88	8-Feb-88	< MDA
LD-APO-0841-00-WL	107	8-Feb-88	8-Feb-88	2.56E-13
LD-APO-0848-00-WL	107	8-Feb-88	8-Feb-88	4.98E-13
LD-APO-0842-00-WL	107	8-Feb-88	8-Feb-88	1.28E-13
LD-APO-0846-00-WL	107	8-Feb-88	8-Feb-88	1.28E-13
LD-APO-0843-00-WL	107	8-Feb-88	8-Feb-88	1.42E-14
LD-APO-0844-00-WL	107	8-Feb-88	8-Feb-88	1.85E-13
LD-APO-0844-00-WL	107	8-Feb-88	8-Feb-88	1.85E-13
LD-APO-0842-00-WL	107	8-Feb-88	8-Feb-88	1.28E-13
LD-LPO-0849-00-OT	107	8-Feb-88	8-Feb-88	1.73E-12
LD-APO-0847-00-WL	107	8-Feb-88	8-Feb-88	2.14E-13
LD-APO-0848-00-WL	107	8-Feb-88	8-Feb-88	4.98E-13
LD-APO-0843-00-WL	107	8-Feb-88	8-Feb-88	1.42E-14
LD-APO-0845-00-WL	107	8-Feb-88	8-Feb-88	< MDA
LD-LPO-0849-00-OT	107	8-Feb-88	8-Feb-88	1.73E-12
LD-APO-0847-00-WL	107	8-Feb-88	8-Feb-88	2.14E-13
LD-APO-0854-00-OT	107	9-Feb-88	9-Feb-88	1.85E-13
LD-APO-0851-00-OT	107	9-Feb-88	9-Feb-88	7.12E-14
LD-APO-0855-00-OT	107	9-Feb-88	9-Feb-88	1.87E-13
LD-LPO-0860-00-OT	107	9-Feb-88	9-Feb-88	1.07E-12
LD-APO-0853-00-OT	107	9-Feb-88	9-Feb-88	7.48E-13
LD-APO-0858-00-OT	107	9-Feb-88	9-Feb-88	1.71E-13
LD-APO-0855-00-OT	107	9-Feb-88	9-Feb-88	1.87E-13
LD-APO-0857-00-OT	107	9-Feb-88	9-Feb-88	7.12E-14
LD-APO-0857-00-OT	107	9-Feb-88	9-Feb-88	7.12E-14

Sample ID	Location	Samp In	Samp Out	Alpha(μCi/ml)
LD-APO-0851-00-OT	107	9-Feb-88	9-Feb-88	7.12E-14
LD-LPO-0860-00-OT	107	9-Feb-88	9-Feb-88	1.07E-12
LD-APO-0852-00-OT	107	9-Feb-88	9-Feb-88	1.85E-13
LD-APO-0854-00-OT	107	9-Feb-88	9-Feb-88	1.85E-13
LD-APO-0853-00-OT	107	9-Feb-88	9-Feb-88	7.48E-13
LD-APO-0858-00-OT	107	9-Feb-88	9-Feb-88	1.71E-13
LD-APO-0856-00-OT	107	9-Feb-88	9-Feb-88	2.80E-13
LD-APO-0852-00-OT	107	9-Feb-88	9-Feb-88	1.85E-13
LD-APO-0856-00-OT	107	9-Feb-88	9-Feb-88	2.80E-13
LD-LPO-0867-00-OT	105	10-Feb-88	10-Feb-88	2.69E-11
LD-APO-0863-00-OT	105	10-Feb-88	10-Feb-88	1.31E-09
LD-APO-0864-01-OT	107	10-Feb-88	10-Feb-88	5.10E-12
LD-APO-0864-01-OT	107	10-Feb-88	10-Feb-88	5.10E-12

Avg./Phase: Phase description:
1.91E-11 μCi/ml dismantlement 107 basement

LD-LPO-0867-00-OT	105	10-Feb-88	10-Feb-88	2.69E-11
LD-APO-0865-00-OT	105	10-Feb-88	10-Feb-88	8.23E-10
LD-APO-0863-00-OT	105	10-Feb-88	10-Feb-88	1.31E-09
LD-APO-0865-00-OT	105	10-Feb-88	10-Feb-88	8.23E-10
LD-APO-0876-00-WL	105	11-Feb-88	11-Feb-88	2.34E-11
LD-APO-0876-00-WL	105	11-Feb-88	11-Feb-88	2.34E-11
LD-APO-0868-00-OT	105	11-Feb-88	11-Feb-88	6.94E-12
LD-APO-0875-00-OT	105	11-Feb-88	11-Feb-88	6.12E-11
LD-APO-0870-00-OT	105	11-Feb-88	11-Feb-88	6.84E-11
LD-APO-0874-00-OT	105	11-Feb-88	11-Feb-88	6.69E-11
LD-APO-0872-00-OT	105	11-Feb-88	11-Feb-88	1.28E-11
LD-APO-0873-00-OT	105	11-Feb-88	11-Feb-88	2.17E-11
LD-APO-0874-00-OT	105	11-Feb-88	11-Feb-88	6.69E-11
LD-APO-0872-00-OT	105	11-Feb-88	11-Feb-88	1.28E-11
LD-APO-0877-00-WL	105	11-Feb-88	11-Feb-88	8.36E-12
LD-APO-0871-00-OT	105	11-Feb-88	11-Feb-88	2.39E-10
LD-LPO-0878-00-OT	105	11-Feb-88	11-Feb-88	3.02E-11
LD-APO-0870-00-OT	105	11-Feb-88	11-Feb-88	6.84E-11
LD-APO-0869-00-OT	105	11-Feb-88	11-Feb-88	9.73E-13
LD-APO-0869-00-OT	105	11-Feb-88	11-Feb-88	9.73E-13
LD-APO-0873-00-OT	105	11-Feb-88	11-Feb-88	2.17E-11
LD-APO-0868-00-OT	105	11-Feb-88	11-Feb-88	6.94E-12
LD-APO-0877-00-WL	105	11-Feb-88	11-Feb-88	8.36E-12
LD-LPO-0878-00-OT	105	11-Feb-88	11-Feb-88	3.02E-11
LD-APO-0871-00-OT	105	11-Feb-88	11-Feb-88	2.39E-10
LD-LPO-0879-00-OT	105	11-Feb-88	11-Feb-88	1.40E-11
LD-APO-0875-00-OT	105	11-Feb-88	11-Feb-88	6.12E-11
LD-LPO-0879-00-OT	105	11-Feb-88	11-Feb-88	1.40E-11
LD-APO-0884-00-WL	105	13-Feb-88	13-Feb-88	1.59E-11
LD-APO-0881-00-WL	105	13-Feb-88	13-Feb-88	5.57E-11
LD-APO-0881-00-WL	105	13-Feb-88	13-Feb-88	5.57E-11

Sample ID	Location	Samp In	Samp Out	Alpha(µCi/ml)
LD-APO-0880-00-OT	105	13-Feb-88	13-Feb-88	6.17E-12
LD-LPO-0889-00-OT	105	13-Feb-88	13-Feb-88	3.02E-11
LD-APO-0880-00-OT	105	13-Feb-88	13-Feb-88	6.17E-12
LD-APO-0887-00-OT	105	13-Feb-88	13-Feb-88	5.72E-13
LD-APO-0882-00-WL	105	13-Feb-88	13-Feb-88	1.68E-10
LD-APO-0885-00-WL	105	13-Feb-88	13-Feb-88	1.05E-10
LD-APO-0883-00-WL	105	13-Feb-88	13-Feb-88	3.76E-11
LD-APO-0883-00-WL	105	13-Feb-88	13-Feb-88	3.76E-11
LD-APO-0885-00-WL	105	13-Feb-88	13-Feb-88	1.05E-10
LD-LPO-0888-00-OT	105	13-Feb-88	13-Feb-88	2.59E-11
LD-APO-0886-00-WL	105	13-Feb-88	13-Feb-88	1.24E-10
LD-APO-0886-00-WL	105	13-Feb-88	13-Feb-88	1.24E-10
LD-APO-0887-00-OT	105	13-Feb-88	13-Feb-88	5.72E-13
LD-APO-0882-00-WL	105	13-Feb-88	13-Feb-88	1.68E-10
LD-APO-0884-00-WL	105	13-Feb-88	13-Feb-88	1.59E-11
LD-LPO-0888-00-OT	105	13-Feb-88	13-Feb-88	2.59E-11
LD-LPO-0889-00-OT	105	13-Feb-88	13-Feb-88	3.02E-11
LD-APO-0892-00-WL	105	14-Feb-88	14-Feb-88	2.99E-11
LD-APO-0898-00-OT	105	14-Feb-88	14-Feb-88	5.70E-10
LD-APO-0890-00-WL	105	14-Feb-88	14-Feb-88	2.59E-11
LD-APO-0897-00-OT	105	14-Feb-88	14-Feb-88	2.27E-10
LD-LPO-0904-00-OT	105	14-Feb-88	14-Feb-88	1.43E-11
LD-APO-0896-00-OT	105	14-Feb-88	14-Feb-88	6.16E-11
LD-HVO-0210-00-OT	105	14-Feb-88	15-Feb-88	2.38E-11
LD-APO-0895-00-WL	105	14-Feb-88	14-Feb-88	2.02E-11
LD-APO-0893-00-WL	105	14-Feb-88	14-Feb-88	9.62E-12
LD-APO-0894-00-WL	105	14-Feb-88	14-Feb-88	3.26E-10
LD-APO-0900-00-OT	105	14-Feb-88	14-Feb-88	9.31E-11
LD-APO-0890-00-WL	105	14-Feb-88	14-Feb-88	2.59E-11
LD-APO-0902-00-OT	105	14-Feb-88	14-Feb-88	5.72E-13
LD-APO-0899-00-OT	105	14-Feb-88	14-Feb-88	3.13E-10
LD-APO-0902-00-OT	105	14-Feb-88	14-Feb-88	5.72E-13
LD-APO-0898-00-OT	105	14-Feb-88	14-Feb-88	5.70E-10
LD-APO-0900-00-OT	105	14-Feb-88	14-Feb-88	9.31E-11
LD-APO-0897-00-OT	105	14-Feb-88	14-Feb-88	2.27E-10
LD-APO-0891-00-WL	105	14-Feb-88	14-Feb-88	1.57E-11
LD-APO-0896-00-OT	105	14-Feb-88	14-Feb-88	6.16E-11
LD-LPO-0904-00-OT	105	14-Feb-88	14-Feb-88	1.43E-11
LD-APO-0895-00-WL	105	14-Feb-88	14-Feb-88	2.02E-11
LD-APO-0901-00-OT	105	14-Feb-88	14-Feb-88	9.24E-11
LD-APO-0894-00-WL	105	14-Feb-88	14-Feb-88	3.26E-10
LD-APO-0901-00-OT	105	14-Feb-88	14-Feb-88	9.24E-11
LD-APO-0893-00-WL	105	14-Feb-88	14-Feb-88	9.62E-12
LD-APO-0891-00-WL	105	14-Feb-88	14-Feb-88	1.57E-11
LD-APO-0903-00-OT	105	14-Feb-88	14-Feb-88	3.24E-13
LD-APO-0903-00-OT	105	14-Feb-88	14-Feb-88	3.24E-13
LD-HVO-0210-00-OT	105	14-Feb-88	15-Feb-88	2.38E-11
LD-APO-0899-00-OT	105	14-Feb-88	14-Feb-88	3.13E-10
LD-APO-0892-00-WL	105	14-Feb-88	14-Feb-88	2.99E-11

Sample ID	Location	Samp In	Samp Out	Alpha(μCi/ml)
LD-APO-0911-00-WL	105	15-Feb-88	15-Feb-88	2.40E-12
LD-APO-0908-00-WL	105	15-Feb-88	15-Feb-88	7.78E-12
LD-APO-0917-00-OT	105	15-Feb-88	15-Feb-88	8.15E-12
LD-APO-0916-00-OT	105	15-Feb-88	15-Feb-88	3.43E-12
LD-LPO-0919-00-OT	105	15-Feb-88	15-Feb-88	1.46E-11
LD-APO-0915-00-OT	105	15-Feb-88	15-Feb-88	3.53E-12
LD-APO-0917-00-OT	105	15-Feb-88	15-Feb-88	8.15E-12
LD-APO-0914-00-OT	105	15-Feb-88	15-Feb-88	4.51E-11
LD-APO-0915-00-OT	105	15-Feb-88	15-Feb-88	3.53E-12
LD-APO-0913-00-OT	105	15-Feb-88	15-Feb-88	9.73E-13
LD-APO-0913-00-OT	105	15-Feb-88	15-Feb-88	9.73E-13
LD-APO-0912-00-WL	105	15-Feb-88	15-Feb-88	3.04E-12
LD-APO-0911-00-WL	105	15-Feb-88	15-Feb-88	2.40E-12
LD-APO-0907-00-WL	105	15-Feb-88	15-Feb-88	1.89E-11
LD-APO-0909-00-WL	105	15-Feb-88	15-Feb-88	3.43E-12
LD-APO-0910-00-WL	105	15-Feb-88	15-Feb-88	1.41E-11
LD-LPO-0918-00-OT	105	15-Feb-88	15-Feb-88	2.27E-12
LD-APO-0909-00-WL	105	15-Feb-88	15-Feb-88	3.43E-12
LD-LPO-0918-00-OT	105	15-Feb-88	15-Feb-88	2.27E-12
LD-APO-0908-00-WL	105	15-Feb-88	15-Feb-88	7.78E-12
LD-APO-0914-00-OT	105	15-Feb-88	15-Feb-88	4.51E-11
LD-APO-0907-00-WL	105	15-Feb-88	15-Feb-88	1.89E-11
LD-APO-0910-00-WL	105	15-Feb-88	15-Feb-88	1.41E-11
LD-APO-0906-00-WL	105	15-Feb-88	15-Feb-88	9.61E-12
LD-APO-0905-00-WL	105	15-Feb-88	15-Feb-88	8.86E-10
LD-APO-0905-00-WL	105	15-Feb-88	15-Feb-88	8.86E-10
LD-APO-0912-00-WL	105	15-Feb-88	15-Feb-88	3.04E-12
LD-APO-0916-00-OT	105	15-Feb-88	15-Feb-88	3.43E-12
LD-LPO-0919-00-OT	105	15-Feb-88	15-Feb-88	1.46E-11
LD-APO-0906-00-WL	105	15-Feb-88	15-Feb-88	9.61E-12
LD-LPO-0931-00-OT	105	16-Feb-88	16-Feb-88	4.01E-11
LD-APO-0920-00-OT	105	16-Feb-88	16-Feb-88	3.09E-12
LD-LPO-0930-00-OT	105	16-Feb-88	16-Feb-88	9.99E-12
LD-APO-0921-00-OT	105	16-Feb-88	16-Feb-88	6.07E-12
LD-APO-0920-00-OT	105	16-Feb-88	16-Feb-88	3.09E-12
LD-LPO-0931-00-OT	105	16-Feb-88	16-Feb-88	4.01E-11
LD-APO-0922-00-OT	105	16-Feb-88	16-Feb-88	5.11E-12
LD-LPO-0930-00-OT	105	16-Feb-88	16-Feb-88	9.99E-12
LD-APO-0924-00-CE	105	16-Feb-88	16-Feb-88	1.83E-11
LD-APO-0932-00-OT	105	16-Feb-88	16-Feb-88	3.77E-12
LD-APO-0926-00-WL	105	16-Feb-88	16-Feb-88	3.99E-10
LD-APO-0929-00-WL	105	16-Feb-88	16-Feb-88	1.09E-09
LD-APO-0928-00-WL	105	16-Feb-88	16-Feb-88	7.54E-12
LD-APO-0928-00-WL	105	16-Feb-88	16-Feb-88	7.54E-12
LD-APO-0932-00-OT	105	16-Feb-88	16-Feb-88	3.77E-12
LD-APO-0927-00-WL	105	16-Feb-88	16-Feb-88	1.25E-10
LD-APO-0921-00-OT	105	16-Feb-88	16-Feb-88	6.07E-12
LD-APO-0926-00-WL	105	16-Feb-88	16-Feb-88	3.99E-10
LD-APO-0925-00-CE	105	16-Feb-88	16-Feb-88	1.45E-10

Sample ID	Location	Samp In	Samp Out	Alpha(μCi/ml)
LD-APO-0925-00-CE	105	16-Feb-88	16-Feb-88	1.45E-10
LD-APO-0929-00-WL	105	16-Feb-88	16-Feb-88	1.09E-09
LD-APO-0924-00-CE	105	16-Feb-88	16-Feb-88	1.83E-11
LD-APO-0923-00-CE	105	16-Feb-88	16-Feb-88	1.91E-11
LD-APO-0922-00-OT	105	16-Feb-88	16-Feb-88	5.11E-12
LD-APO-0927-00-WL	105	16-Feb-88	16-Feb-88	1.25E-10
LD-APO-0923-00-CE	105	16-Feb-88	16-Feb-88	1.91E-11
LD-APO-0940-00-WL	105	17-Feb-88	17-Feb-88	6.84E-12
LD-APO-0933-00-WL	105	17-Feb-88	17-Feb-88	1.02E-10
LD-APO-0933-00-WL	105	17-Feb-88	17-Feb-88	1.02E-10
LD-APO-0934-00-WL	105	17-Feb-88	17-Feb-88	2.44E-11
LD-APO-0935-00-CE	105	17-Feb-88	17-Feb-88	6.36E-11
LD-APO-0935-00-CE	105	17-Feb-88	17-Feb-88	6.36E-11
LD-APO-0937-00-WL	105	17-Feb-88	17-Feb-88	1.26E-10
LD-APO-0936-00-WL	105	17-Feb-88	17-Feb-88	3.28E-12
LD-APO-0939-00-WL	105	17-Feb-88	17-Feb-88	6.40E-11
LD-APO-0937-00-WL	105	17-Feb-88	17-Feb-88	1.26E-10
LD-APO-0941-00-OT	105	17-Feb-88	17-Feb-88	2.06E-12
LD-APO-0938-00-WL	105	17-Feb-88	17-Feb-88	6.32E-11
LD-APO-0945-00-OT	105	17-Feb-88	17-Feb-88	2.99E-10
LD-APO-0939-00-WL	105	17-Feb-88	17-Feb-88	6.40E-11
LD-LPO-0942-00-OT	105	17-Feb-88	17-Feb-88	1.49E-11
LD-APO-0941-00-OT	105	17-Feb-88	17-Feb-88	2.06E-12
LD-APO-0934-00-WL	105	17-Feb-88	17-Feb-88	2.44E-11
LD-APO-0944-00-WL	105	17-Feb-88	17-Feb-88	9.15E-11
LD-APO-0938-00-WL	105	17-Feb-88	17-Feb-88	6.32E-11
LD-APO-0945-00-OT	105	17-Feb-88	17-Feb-88	2.99E-10
LD-APO-0944-00-WL	105	17-Feb-88	17-Feb-88	9.15E-11
LD-APO-0946-00-WL	105	17-Feb-88	17-Feb-88	2.79E-10
LD-LPO-0943-00-OT	105	17-Feb-88	17-Feb-88	9.64E-12
LD-LPO-0942-00-OT	105	17-Feb-88	17-Feb-88	1.49E-11
LD-APO-0940-00-WL	105	17-Feb-88	17-Feb-88	6.84E-12
LD-APO-0936-00-WL	105	17-Feb-88	17-Feb-88	3.28E-12
LD-APO-0946-00-WL	105	17-Feb-88	17-Feb-88	2.79E-10
LD-LPO-0943-00-OT	105	17-Feb-88	17-Feb-88	9.64E-12
LD-HVO-0958-00-WL	105	18-Feb-88	18-Feb-88	2.03E-11
LD-HVO-0957-00-WL	105	18-Feb-88	18-Feb-88	2.18E-11
LD-HVO-0959-00-OT	105	18-Feb-88	18-Feb-88	2.00E-12
LD-APO-0956-00-WL	105	18-Feb-88	18-Feb-88	2.90E-11
LD-HVO-0957-00-WL	105	18-Feb-88	18-Feb-88	2.18E-11
LD-APO-0955-00-WL	105	18-Feb-88	18-Feb-88	1.45E-11
LD-APO-0955-00-WL	105	18-Feb-88	18-Feb-88	1.45E-11
LD-APO-0954-00-WL	105	18-Feb-88	18-Feb-88	1.79E-11
LD-APO-0953-00-WL	105	18-Feb-88	18-Feb-88	8.42E-11
LD-APO-0953-00-WL	105	18-Feb-88	18-Feb-88	8.42E-11
LD-APO-0951-00-WL	105	18-Feb-88	18-Feb-88	2.32E-10
LD-APO-0952-00-WL	105	18-Feb-88	18-Feb-88	3.17E-11
LD-APO-0949-00-WL	105	18-Feb-88	18-Feb-88	5.32E-12
LD-APO-0951-00-WL	105	18-Feb-88	18-Feb-88	2.32E-10

Sample ID	Location	Samp In	Samp Out	Alpha(μCi/ml)
LD-APO-0947-00-WL	105	18-Feb-88	18-Feb-88	7.87E-11
LD-APO-0950-00-WL	105	18-Feb-88	18-Feb-88	2.11E-11
LD-HVO-0958-00-WL	105	18-Feb-88	18-Feb-88	2.03E-11
LD-APO-0949-00-WL	105	18-Feb-88	18-Feb-88	5.32E-12
LD-APO-0956-00-WL	105	18-Feb-88	18-Feb-88	2.90E-11
LD-APO-0948-00-CE	105	18-Feb-88	18-Feb-88	1.89E-12
LD-APO-0952-00-WL	105	18-Feb-88	18-Feb-88	3.17E-11
LD-APO-0947-00-WL	105	18-Feb-88	18-Feb-88	7.87E-11
LD-APO-0948-00-CE	105	18-Feb-88	18-Feb-88	1.89E-12
LD-HVO-0959-00-OT	105	18-Feb-88	18-Feb-88	2.00E-12
LD-LPO-0960-00-OT	105	18-Feb-88	18-Feb-88	6.16E-12
LD-LPO-0960-00-OT	105	18-Feb-88	18-Feb-88	6.16E-12
LD-APO-0950-00-WL	105	18-Feb-88	18-Feb-88	2.11E-11
LD-APO-0954-00-WL	105	18-Feb-88	18-Feb-88	1.79E-11
LD-LPO-0961-00-OT	105	18-Feb-88	18-Feb-88	4.68E-12
LD-LPO-0961-00-OT	105	18-Feb-88	18-Feb-88	4.68E-12
LD-HVO-0965-00-WL	105	20-Feb-88	20-Feb-88	4.09E-12
LD-APO-0977-00-WL	105	20-Feb-88	20-Feb-88	6.46E-12
LD-HVO-0968-00-WL	105	20-Feb-88	20-Feb-88	3.57E-12
LD-APO-0978-00-OT	105	20-Feb-88	20-Feb-88	1.90E-13
LD-APO-0981-00-WL	105	20-Feb-88	20-Feb-88	1.71E-12
LD-APO-0979-00-WL	105	20-Feb-88	20-Feb-88	2.09E-12
LD-HVO-0963-00-WL	105	20-Feb-88	20-Feb-88	1.52E-11
LD-APO-0980-00-WL	105	20-Feb-88	20-Feb-88	3.80E-13
LD-HVO-0965-00-WL	105	20-Feb-88	20-Feb-88	4.09E-12
LD-APO-0981-00-WL	105	20-Feb-88	20-Feb-88	1.71E-12
LD-HVO-0967-00-WL	105	20-Feb-88	20-Feb-88	1.41E-11
LD-HVO-0962-00-WL	105	20-Feb-88	20-Feb-88	8.37E-12
LD-HVO-0969-00-WL	105	20-Feb-88	20-Feb-88	8.89E-12
LD-HVO-0963-00-WL	105	20-Feb-88	20-Feb-88	1.52E-11
LD-HVO-0971-00-WL	105	20-Feb-88	20-Feb-88	1.80E-11
LD-HVO-0964-00-WL	105	20-Feb-88	20-Feb-88	8.89E-12
LD-HVO-0973-00-WL	105	20-Feb-88	20-Feb-88	9.41E-12
LD-APO-0978-00-OT	105	20-Feb-88	20-Feb-88	1.90E-13
LD-HVO-0975-00-OT	105	20-Feb-88	20-Feb-88	1.04E-12
LD-APO-0979-00-WL	105	20-Feb-88	20-Feb-88	2.09E-12
LD-LPO-0983-00-OT	105	20-Feb-88	20-Feb-88	2.02E-11
LD-HVO-0966-00-WL	105	20-Feb-88	20-Feb-88	5.16E-11
LD-APO-0976-00-WL	105	20-Feb-88	20-Feb-88	5.70E-12
LD-HVO-0967-00-WL	105	20-Feb-88	20-Feb-88	1.41E-11
LD-APO-0980-00-WL	105	20-Feb-88	20-Feb-88	3.80E-13
LD-LPO-0983-00-OT	105	20-Feb-88	20-Feb-88	2.02E-11
LD-HVO-0964-00-WL	105	20-Feb-88	20-Feb-88	8.89E-12
LD-LPO-0982-00-OT	105	20-Feb-88	20-Feb-88	7.66E-12
LD-HVO-0968-00-WL	105	20-Feb-88	20-Feb-88	3.57E-12
LD-HVO-0975-00-OT	105	20-Feb-88	20-Feb-88	1.04E-12
LD-HVO-0972-00-WL	105	20-Feb-88	20-Feb-88	4.22E-12
LD-HVO-0974-00-WL	105	20-Feb-88	20-Feb-88	1.71E-12
LD-LPO-0982-00-OT	105	20-Feb-88	20-Feb-88	7.66E-12

Sample ID	Location	Samp In	Samp Out	Alpha(µCi/ml)
LD-HVO-0973-00-WL	105	20-Feb-88	20-Feb-88	9.41E-12
LD-APO-0976-00-WL	105	20-Feb-88	20-Feb-88	5.70E-12
LD-HVO-0972-00-WL	105	20-Feb-88	20-Feb-88	4.22E-12
LD-HVO-0966-00-WL	105	20-Feb-88	20-Feb-88	5.16E-11
LD-HVO-0971-00-WL	105	20-Feb-88	20-Feb-88	1.80E-11
LD-HVO-0974-00-WL	105	20-Feb-88	20-Feb-88	1.71E-12
LD-HVO-0970-00-WL	105	20-Feb-88	20-Feb-88	1.50E-11
LD-HVO-0962-00-WL	105	20-Feb-88	20-Feb-88	8.37E-12
LD-APO-0977-00-WL	105	20-Feb-88	20-Feb-88	6.46E-12
LD-HVO-0970-00-WL	105	20-Feb-88	20-Feb-88	1.50E-11
LD-HVO-0969-00-WL	105	20-Feb-88	20-Feb-88	8.89E-12
LD-HVO-0986-00-WL	105	23-Feb-88	23-Feb-88	2.22E-12
LD-HVO-0988-00-OT	105	23-Feb-88	23-Feb-88	1.08E-11
LD-APO-0984-00-WL	105	23-Feb-88	23-Feb-88	3.89E-12
LD-HVO-0987-00-OT	105	23-Feb-88	23-Feb-88	5.12E-12
LD-HVO-0987-00-OT	105	23-Feb-88	23-Feb-88	5.12E-12
LD-HVO-0986-00-WL	105	23-Feb-88	23-Feb-88	2.22E-12
LD-HVO-0989-00-OT	105	23-Feb-88	23-Feb-88	7.90E-12
LD-HVO-0990-00-OT	105	23-Feb-88	23-Feb-88	3.06E-12
LD-HVO-0991-00-OT	105	23-Feb-88	23-Feb-88	5.45E-12
LD-HVO-0991-00-OT	105	23-Feb-88	23-Feb-88	5.45E-12
LD-HVO-0989-00-OT	105	23-Feb-88	23-Feb-88	7.90E-12
LD-HVO-0992-00-OT	105	23-Feb-88	23-Feb-88	1.78E-12
LD-HVO-0988-00-OT	105	23-Feb-88	23-Feb-88	1.08E-11
LD-APO-0985-00-WL	105	23-Feb-88	23-Feb-88	4.67E-12
LD-HVO-0992-00-OT	105	23-Feb-88	23-Feb-88	1.78E-12
LD-HVO-0990-00-OT	105	23-Feb-88	23-Feb-88	3.06E-12
LD-APO-0985-00-WL	105	23-Feb-88	23-Feb-88	4.67E-12
LD-APO-0984-00-WL	105	23-Feb-88	23-Feb-88	3.89E-12
LD-HVO-1007-00-WL	105	24-Feb-88	24-Feb-88	1.60E-10
LD-HVO-1009-00-WL	105	24-Feb-88	24-Feb-88	3.53E-10
LD-HVO-1004-00-OT	105	24-Feb-88	24-Feb-88	1.43E-10
LD-HVO-1000-00-OT	105	24-Feb-88	24-Feb-88	1.76E-11
LD-LPO-1008-00-OT	105	24-Feb-88	24-Feb-88	6.58E-11
LD-HVO-1000-00-OT	105	24-Feb-88	24-Feb-88	1.76E-11
LD-HVO-1010-00-OT	105	24-Feb-88	24-Feb-88	1.35E-09
LD-HVO-1004-00-OT	105	24-Feb-88	24-Feb-88	1.43E-10
LD-HVO-1007-00-WL	105	24-Feb-88	24-Feb-88	1.60E-10
LD-HVO-1005-00-WL	105	24-Feb-88	24-Feb-88	5.11E-10
LD-HVO-1005-00-WL	105	24-Feb-88	24-Feb-88	5.11E-10
LD-HVO-1006-00-CE	105	24-Feb-88	24-Feb-88	5.78E-10
LD-HVO-1010-00-OT	105	24-Feb-88	24-Feb-88	1.35E-09
LD-HVO-1006-00-CE	105	24-Feb-88	24-Feb-88	5.78E-10
LD-HVO-1009-00-WL	105	24-Feb-88	24-Feb-88	3.53E-10
LD-LPO-1008-00-OT	105	24-Feb-88	24-Feb-88	6.58E-11
LD-HVO-1013-00-OT	105	25-Feb-88	25-Feb-88	1.08E-11
LD-HVO-1019-00-WL	105	25-Feb-88	25-Feb-88	6.02E-11
LD-HVO-1020-00-OT	105	25-Feb-88	25-Feb-88	9.16E-11
LD-HVO-1018-00-WL	105	25-Feb-88	25-Feb-88	8.71E-11

Sample ID	Location	Samp In	Samp Out	Alpha(μCi/ml)
LD-HVO-1021-00-WL	105	25-Feb-88	25-Feb-88	8.28E-10
LD-HVO-1016-00-WL	105	25-Feb-88	25-Feb-88	1.88E-11
LD-LPO-1022-00-OT	105	25-Feb-88	25-Feb-88	2.60E-12
LD-HVO-1018-00-WL	105	25-Feb-88	25-Feb-88	8.71E-11
LD-LPO-1023-00-OT	105	25-Feb-88	25-Feb-88	1.56E-11
LD-HVO-1016-00-WL	105	25-Feb-88	25-Feb-88	1.88E-11
LD-HVO-1019-00-WL	105	25-Feb-88	25-Feb-88	6.02E-11
LD-LPO-1023-00-OT	105	25-Feb-88	25-Feb-88	1.56E-11
LD-HVO-1020-00-OT	105	25-Feb-88	25-Feb-88	9.16E-11
LD-HVO-1017-00-WL	105	25-Feb-88	25-Feb-88	3.47E-11
LD-HVO-1021-00-WL	105	25-Feb-88	25-Feb-88	8.28E-10
LD-HVO-1014-00-OT	105	25-Feb-88	25-Feb-88	2.05E-11
LD-HVO-1017-00-WL	105	25-Feb-88	25-Feb-88	3.47E-11
LD-HVO-1014-00-OT	105	25-Feb-88	25-Feb-88	2.05E-11
LD-LPO-1022-00-OT	105	25-Feb-88	25-Feb-88	2.60E-12
LD-HVO-1028-00-WL	105	27-Feb-88	27-Feb-88	9.49E-13
LD-HVO-1026-00-OT	105	27-Feb-88	27-Feb-88	1.14E-12
LD-HVO-1027-00-OT	105	27-Feb-88	27-Feb-88	1.90E-12
LD-HVO-1027-00-OT	105	27-Feb-88	27-Feb-88	1.90E-12
LD-HVO-1026-00-OT	105	27-Feb-88	27-Feb-88	1.14E-12
LD-HVO-1028-00-WL	105	27-Feb-88	27-Feb-88	9.49E-13
LD-HVO-1024-00-OT	105	27-Feb-88	27-Feb-88	1.67E-12
LD-HVO-1024-00-OT	105	27-Feb-88	27-Feb-88	1.67E-12
LD-HVO-1029-00-WL	105	27-Feb-88	27-Feb-88	< MDA
LD-HVO-1025-00-WL	105	27-Feb-88	27-Feb-88	2.98E-12
LD-HVO-1029-00-WL	105	27-Feb-88	27-Feb-88	< MDA
LD-HVO-1025-00-WL	105	27-Feb-88	27-Feb-88	2.98E-12

Avg./Phase: 1.64E-10 μCi/ml

Phase description: dismantlement 105 basement

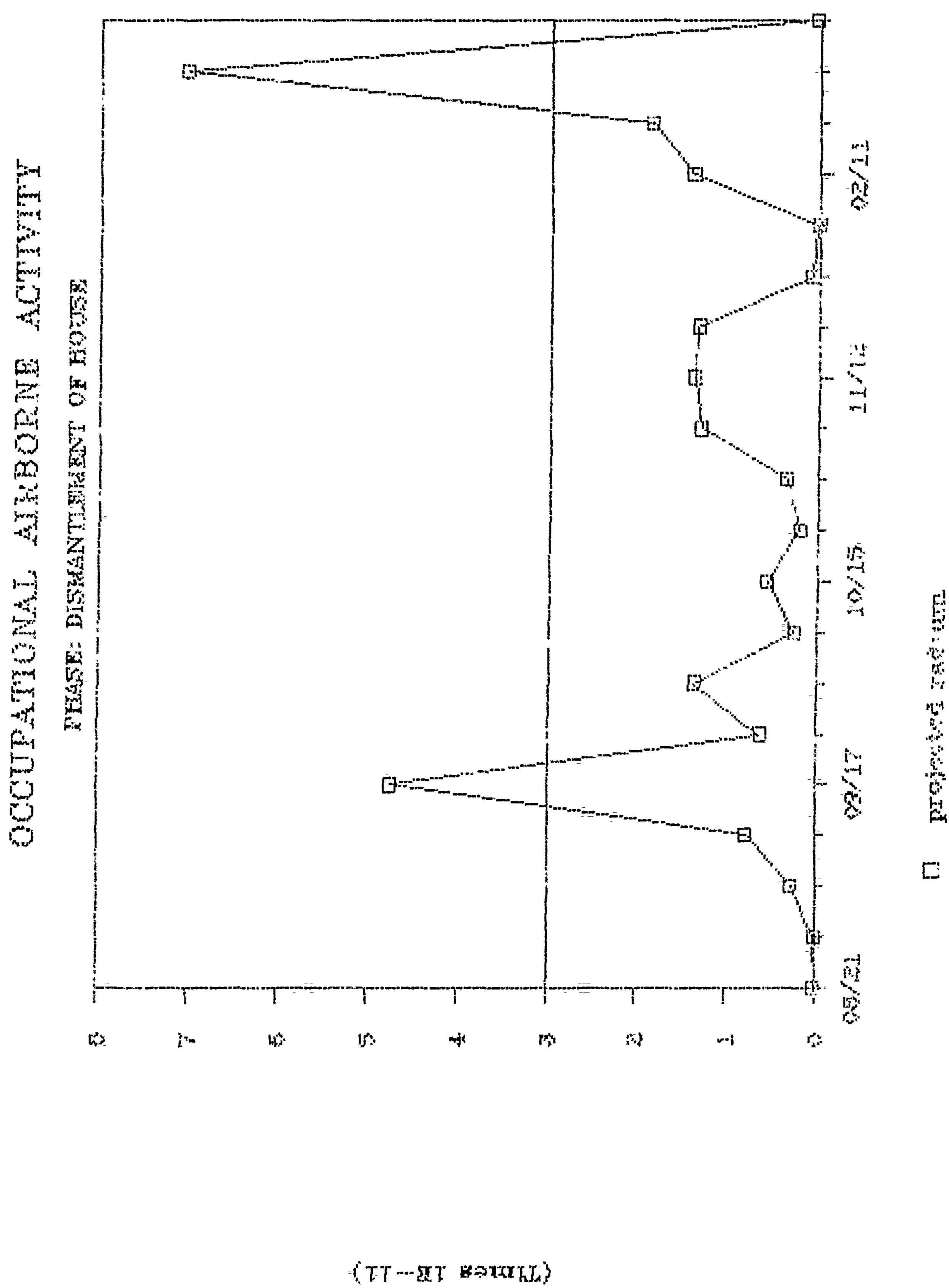


FIGURE G.1 OCCUPATIONAL AIRBORNE ACTIVITY
(PROJECTED RADIUM)

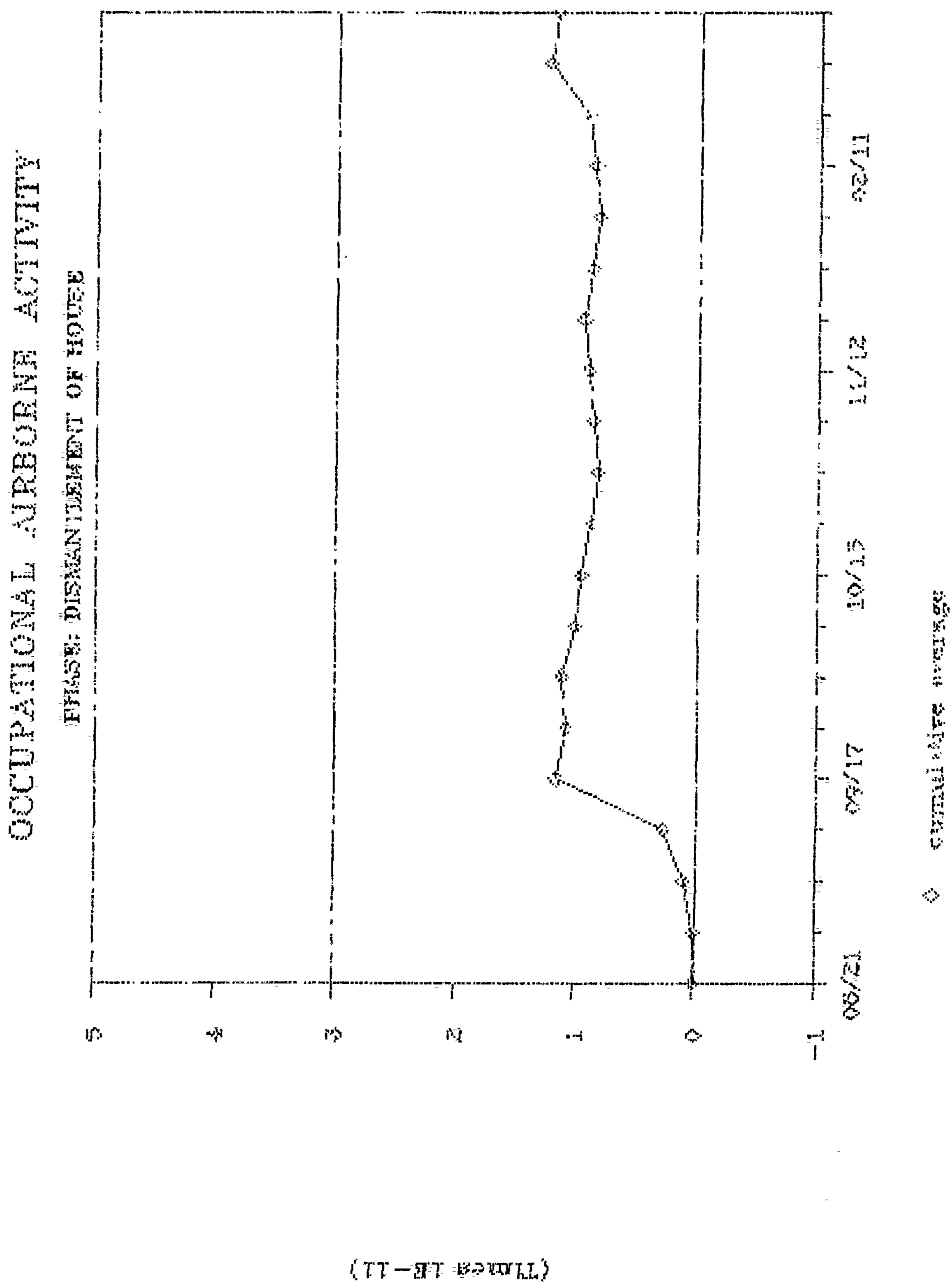


FIGURE G.2 OCCUPATIONAL AIRBORNE ACTIVITY
(CUMULATIVE AVERAGE)

OCCUPATIONAL RADON PROGENY DATA (WORKING LEVELS)

PHASE: DISMANTLEMENT OF HOUSE

Sample ID	Date	Time	Conc. (WL)
LD-WLO-0100	29-Nov-88	1521	2.08E-03
LD-WLO-0102	30-Nov-88	728	7.42E-04
LD-WLO-0104	1-Dec-88	945	2.10E-03
LD-WLO-0105	1-Dec-88	1250	2.18E-03
LD-WLO-0107	2-Dec-88	1133	2.69E-03
LD-WLO-0109	3-Dec-88	1005	1.78E-03
LD-WLO-0112	5-Dec-88	830	3.82E-04
LD-WLO-0113	5-Dec-88	1535	1.80E-03
LD-WLO-0115	6-Dec-88	807	2.16E-03
LD-WLO-0117	7-Dec-88	818	3.70E-03
LD-WLO-0118	8-Dec-88	716	9.20E-04
LD-WLO-0122	9-Dec-88	835	4.96E-03
LD-WLO-0124	9-Dec-88	1538	2.74E-04
LD-WLO-0125	12-Dec-88	1020	4.89E-03
LD-WLO-0128	12-Dec-88	1110	2.10E-03
LD-WLO-0131	13-Dec-88	815	1.29E-03
LD-WLO-0133	13-Dec-88	1553	3.67E-03
LD-WLO-0135	14-Dec-88	732	4.20E-03
LD-WLO-0136	15-Dec-88	700	6.48E-04
LD-WLO-0137	15-Dec-88	815	5.94E-03
LD-WLO-0140	16-Dec-88	1510	1.72E-04
LD-WLO-0142	17-Dec-88	1050	9.73E-04
LD-WLO-0144	19-Dec-88	1420	1.29E-03
LD-WLO-0146	20-Dec-88	810	4.13E-03
LD-WLO-0149	21-Dec-88	750	1.19E-03
LD-WLO-0151	3-Jan-89	935	2.03E-03
LD-WLO-0153	4-Jan-89	820	6.00E-04
LD-WLO-0155	5-Jan-89	1343	5.74E-04
LD-WLO-0157	6-Jan-89	719	9.48E-05
LD-WLO-0161	7-Jan-89	933	6.99E-04
LD-WLO-0164	9-Jan-89	746	7.66E-04
LD-WLO-0166	10-Jan-89	710	1.09E-03
LD-WLO-0169	11-Jan-89	703	3.37E-03
LD-WLO-0171	13-Jan-89	739	8.27E-04
LD-WLO-0174	13-Jan-89	1554	6.49E-04
LD-WLO-0176	14-Jan-89	704	2.03E-03
LD-WLO-0178	14-Jan-89	1510	1.18E-03
LD-WLO-0180	16-Jan-89	739	4.10E-04
LD-WLO-0182	16-Jan-89	1505	3.80E-04
LD-WLO-0183	17-Jan-89	710	5.20E-03
LD-WLO-0186	17-Jan-89	1510	5.90E-05
LD-WLO-0187	18-Jan-89	700	4.50E-03
LD-WLO-0190	19-Jan-89	725	2.90E-03
LD-WLO-0192	19-Jan-89	1353	1.20E-03
LD-WLO-0194	20-Jan-89	755	3.30E-03
LD-WLO-0196	21-Jan-89	745	5.50E-04

OCCUPATIONAL RADON PROGENY DATA (WORKING LEVELS)

PHASE: DISMANTLEMENT OF HOUSE

Sample ID	Date	Time	Conc. (WL)
LD-WLO-0200	23-Jan-89	845	8.50E-04
LD-WLO-0201	23-Jan-89	1305	6.20E-04
LD-WLO-0203	24-Jan-89	730	7.30E-03
LD-WLO-0206	24-Jan-89	1325	9.50E-04
LD-WLO-0207	25-Jan-89	720	1.60E-03
LD-WLO-0209	25-Jan-89	1046	3.60E-03
LD-WLO-0210	25-Jan-89	1049	2.60E-03
LD-WLO-0211	25-Jan-89	1112	2.40E-01
LD-WLO-0212	25-Jan-89	1116	4.20E-01
LD-WLO-0214	25-Jan-89	1318	5.30E-04
LD-WLO-0215	26-Jan-89	739	5.00E-02
LD-WLO-0216	26-Jan-89	743	5.50E-02
LD-WLO-0221	27-Jan-89	1109	6.70E-02
LD-WLO-0222	27-Jan-89	1113	7.20E-02
LD-WLO-0230	31-Jan-89	953	6.30E-02
LD-WLO-0231	31-Jan-89	957	1.00E-01
LD-WLO-0234	1-Feb-89	1010	4.30E-02
LD-WLO-0236	1-Feb-89	1300	7.10E-03
LD-WLO-0238	2-Feb-89	725	4.50E-03
LD-WLO-0240	2-Feb-89	1520	5.30E-04
LD-WLO-0242	6-Feb-89	755	5.60E-04
LD-WLO-0244	6-Feb-89	1527	1.50E-03
LD-WLO-0246	7-Feb-89	935	1.00E-03
LD-WLO-0248	7-Feb-89	1525	2.40E-04
LD-WLO-0249	8-Feb-89	735	2.82E-04
LD-WLO-0252	8-Feb-89	1455	1.58E-03
LD-WLO-0253	9-Feb-89	803	2.82E-04
LD-WLO-0256	9-Feb-89	1350	< MDA
LD-WLO-0260	10-Feb-89	1505	9.36E-03
LD-WLO-0261	11-Feb-89	830	2.36E-03
LD-WLO-0263	11-Feb-89	1250	1.18E-03
LD-WLO-0265	13-Feb-89	710	7.17E-03
LD-WLO-0268	13-Feb-89	1400	6.27E-03
LD-WLO-0269	14-Feb-89	727	4.00E-02
LD-WLO-0272	14-Feb-89	1540	1.30E-02
LD-WLO-0273	15-Feb-89	742	2.00E-02
LD-WLO-0277	16-Feb-89	939	4.50E-02
LD-WLO-0279	16-Feb-89	1310	7.85E-03
LD-WLO-0281	17-Feb-89	750	1.50E-02
LD-WLO-0287	20-Feb-89	756	5.14E-03
LD-WLO-0290	20-Feb-89	1308	7.19E-03
LD-WLO-0293	23-Feb-89	706	1.10E-02
LD-WLO-0299	24-Feb-89	1400	8.54E-03

OCCUPATIONAL RADON PROGENY DATA (WORKING LEVELS)

DAILY AVERAGES

PHASE: DISMANTLEMENT OF HOUSE

Date	Conc. (WL)
29-Nov-88	2.08E-03
30-Nov-88	7.42E-04
1-Dec-88	2.10E-03
2-Dec-88	2.18E-03
3-Dec-88	2.69E-03
5-Dec-88	1.78E-03
6-Dec-88	3.82E-04
7-Dec-88	1.80E-03
8-Dec-88	2.16E-03
9-Dec-88	3.70E-03
12-Dec-88	9.20E-04
13-Dec-88	4.96E-03
14-Dec-88	2.74E-04
15-Dec-88	4.89E-03
17-Dec-88	2.10E-03
19-Dec-88	1.29E-03
20-Dec-88	3.67E-03
21-Dec-88	4.20E-03
3-Jan-89	6.48E-04
4-Jan-89	5.94E-03
5-Jan-89	1.72E-04
6-Jan-89	9.73E-04
7-Jan-89	1.29E-03
9-Jan-89	4.13E-03
10-Jan-89	1.19E-03
11-Jan-89	2.03E-03
13-Jan-89	6.00E-04
14-Jan-89	5.74E-04
16-Jan-89	9.48E-05
17-Jan-89	6.99E-04
18-Jan-89	7.66E-04
19-Jan-89	1.09E-03
20-Jan-89	3.37E-03
21-Jan-89	8.27E-04
23-Jan-89	6.49E-04
24-Jan-89	2.03E-03
25-Jan-89	1.18E-03
26-Jan-89	4.10E-04
27-Jan-89	3.80E-04
31-Jan-89	5.20E-03
1-Feb-89	5.90E-05

OCCUPATIONAL RADON PROGENY DATA (WORKING LEVELS)

DAILY AVERAGES

PHASE: DISMANTLEMENT OF HOUSE

Date	Conc. (WL)
2-Feb-89	4.50E-03
6-Feb-89	2.90E-03
7-Feb-89	1.20E-03
8-Feb-89	3.30E-03
9-Feb-89	5.50E-04
10-Feb-89	8.50E-04
11-Feb-89	6.20E-04
13-Feb-89	7.30E-03
14-Feb-89	9.50E-04
15-Feb-89	1.60E-03
16-Feb-89	3.60E-03
17-Feb-89	2.60E-03
20-Feb-89	2.40E-01
23-Feb-89	4.20E-01
24-Feb-89	5.30E-04

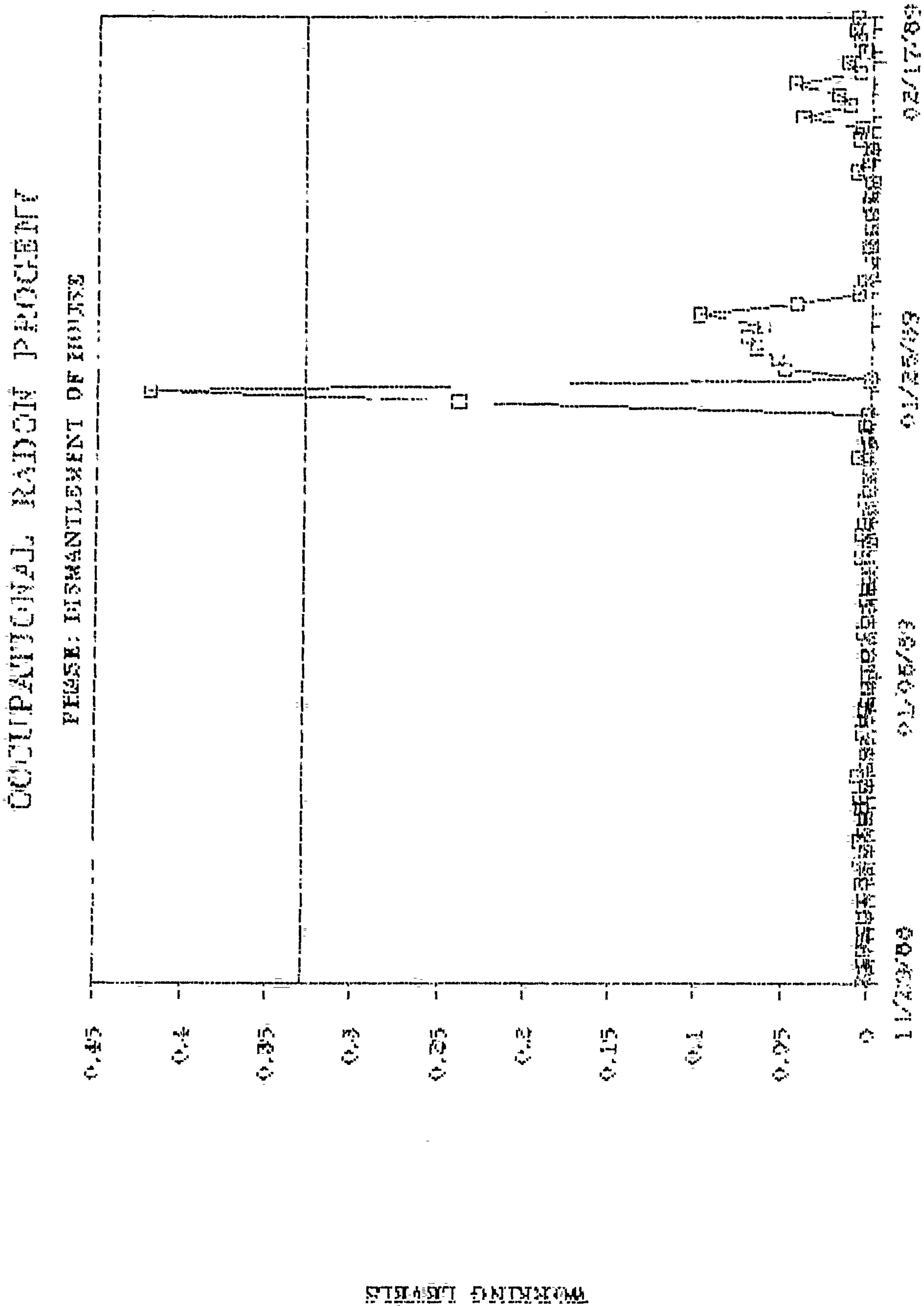


FIGURE G.3 OCCUPATIONAL WL

APPENDIX 4-B

ENVIRONMENTAL AIR SAMPLES

ENVIRONMENTAL AIR SAMPLES

.0 GENERAL

Appendix H contains the data sets for the environmental air sampling program. As the environmental data shows low levels of airborne activity, it was not corrected to show the actual radium activity. Rather, the gross alpha values were treated as the actual radium values. It should be noted that the actual radium concentrations in air would be significantly lower had a correction been applied. Shown below is the a key to identify the types of measurements taken.

AIR SAMPLE ID

L D - A P E - 0 0 0 1

UNIQUE SEQUENTIAL SAMPLE IDENTIFIER

TYPE OF AIR SAMPLE COLLECTED
APE = AIR PARTICULATE ENVIRONMENTAL
WLE = WORKING LEVEL ENVIRONMENTAL

PROJECT SITE
LD = LANSDOWNE, PA

LOCATION CODE

0 1

AIR SAMPLER STATION ID
1 = CAM STATION # 1
2 = CAM STATION # 2
3 = CAM STATION # 3
4 = CAM STATION # 4

SAMPLER TYPE
0 = ALPHA - 5
1 = AMS - 3

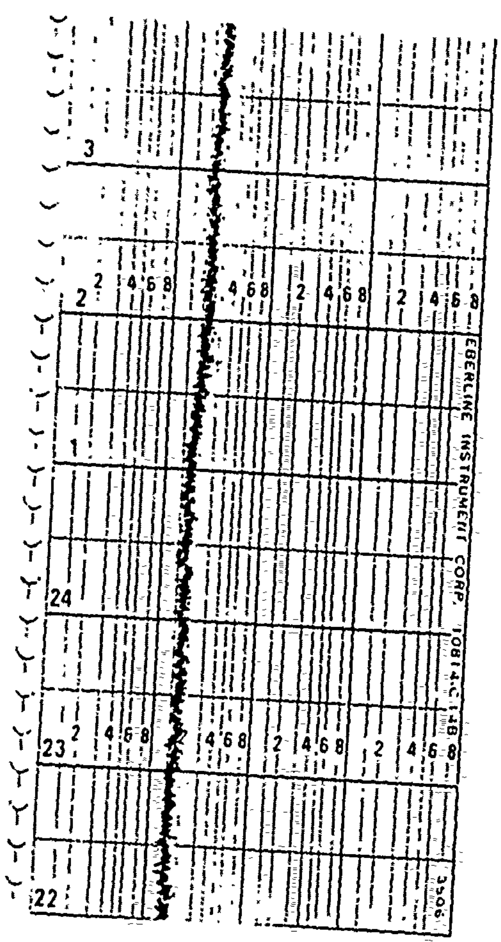


FIGURE H.1 EXAMPLE CAM LOG

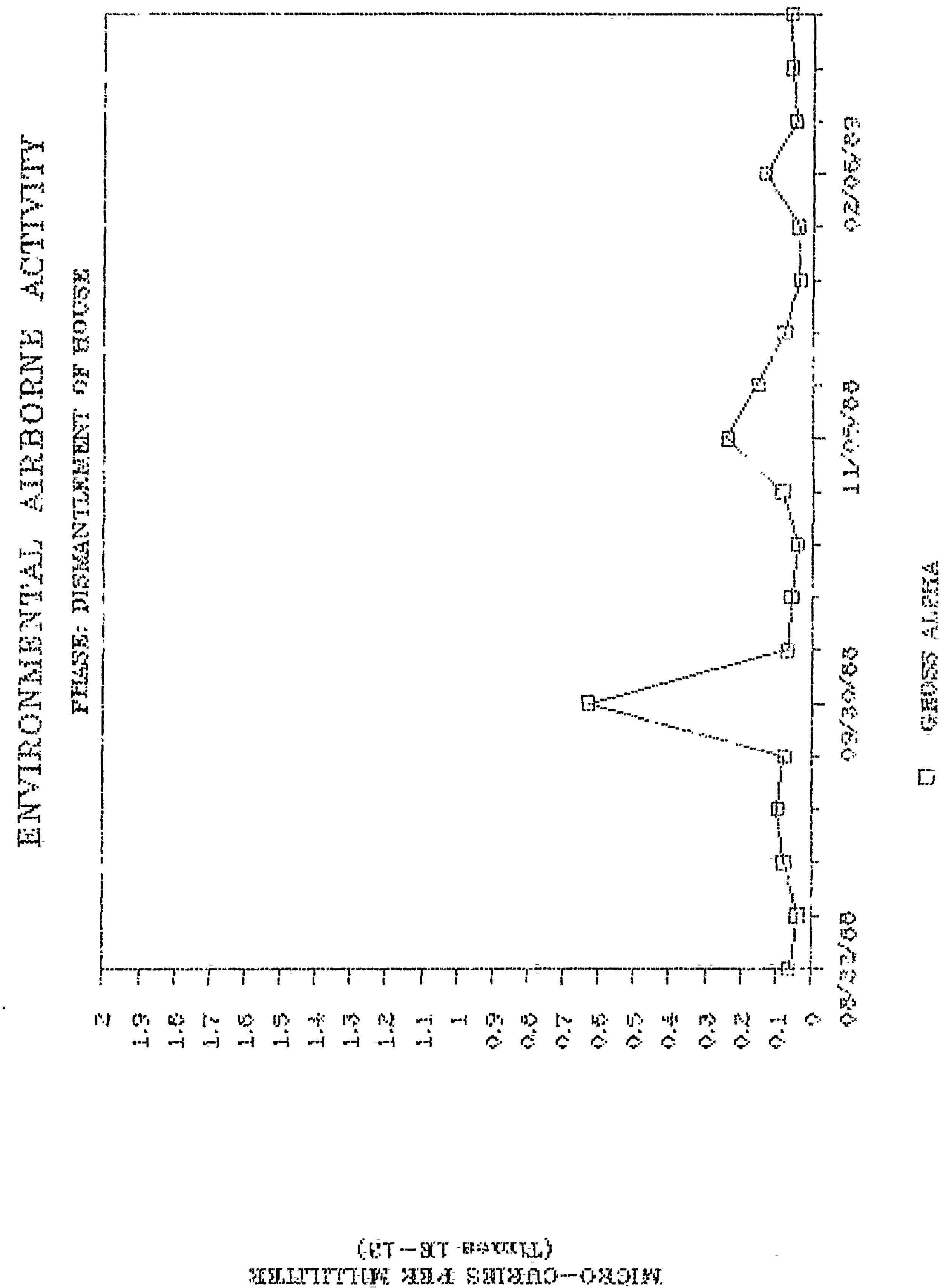


FIGURE H.2 ENVIRONMENTAL AIRBORNE ACTIVITY
GROSS ALPHA

ENVIRONMENTAL DATA FOR CAM STATION #1

PHASE: DISMANTLEMENT OF HOUSE

Sample ID	Location	Samp In	Samp Out	Alpha (μCi/ml)
LD-APE-0001	01	22-Aug-88	3-Sep-88	7.38E-15
LD-APE-0002	11	22-Aug-88	3-Sep-88	1.16E-14
LD-APE-0007	01	3-Sep-88	10-Sep-88	1.80E-15
LD-APE-0008	11	3-Sep-88	10-Sep-88	7.55E-15
LD-APE-0015	01	10-Sep-88	17-Sep-88	8.52E-15
LD-APE-0016	11	10-Sep-88	17-Sep-88	1.91E-14
LD-APE-0023	01	17-Sep-88	24-Sep-88	5.81E-15
LD-APE-0024	11	17-Sep-88	24-Sep-88	7.62E-15
LD-APE-0032	01	24-Sep-88	30-Sep-88	1.30E-14
LD-APE-0033	01	24-Sep-88	30-Sep-88	4.00E-15
LD-APE-0044	01	30-Sep-88	8-Oct-88	6.60E-15
LD-APE-0045	11	30-Sep-88	8-Oct-88	1.50E-15
LD-APE-0053	11	8-Oct-88	15-Oct-88	7.10E-16
LD-APE-0060	01	8-Oct-88	15-Oct-88	7.80E-15
LD-APE-0063	11	15-Oct-88	22-Oct-88	4.50E-15
LD-APE-0071	01	22-Oct-88	28-Oct-88	2.60E-15
LD-APE-0072	11	22-Oct-88	28-Oct-88	4.10E-15
LD-APE-0080	01	28-Oct-88	5-Nov-88	5.20E-15
LD-APE-0081	11	28-Oct-88	5-Nov-88	4.90E-15
LD-APE-0090	01	5-Nov-88	14-Nov-88	4.80E-15
LD-APE-0091	11	5-Nov-88	14-Nov-88	7.30E-15
LD-APE-0099	01	14-Nov-88	19-Nov-88	8.70E-15
LD-APE-0100	11	14-Nov-88	19-Nov-88	4.60E-15
LD-APE-0165	01	7-Jan-88	14-Jan-88	5.10E-15
LD-APE-0166	11	7-Jan-88	14-Jan-88	2.10E-15
LD-APE-0197	11	31-Jan-88	6-Feb-88	2.20E-14
LD-APE-0198	01	31-Jan-88	6-Feb-88	1.52E-15
LD-APE-0201	01	6-Feb-88	11-Feb-88	7.48E-15
LD-APE-0202	11	6-Feb-88	11-Feb-88	3.33E-15
LD-APE-0218	01	11-Feb-88	18-Feb-88	2.64E-15
LD-APE-0219	11	11-Feb-88	18-Feb-88	3.30E-15
LD-APE-0227	01	18-Feb-88	25-Feb-88	1.41E-15
LD-APE-0228	11	18-Feb-88	25-Feb-88	0.00E+00
LD-APE-0236	01	25-Feb-88	3-Mar-88	4.24E-15
LD-APE-0237	11	25-Feb-88	3-Mar-88	4.24E-15

Note: Alpha activity of 0 indicates result less than MDA

WEEKLY AVERAGES FOR CAM STATION #1

PHASE: DISMANTLEMENT OF HOUSE

Start date	Stop date	Average Alpha Activity ($\mu Ci/ml$)
22-Aug-88	3-Sep-88	9.49E-15
3-Sep-88	10-Sep-88	4.68E-15
10-Sep-88	17-Sep-88	1.38E-14
17-Sep-88	24-Sep-88	6.71E-15
24-Sep-88	30-Sep-88	8.50E-15
30-Sep-88	8-Oct-88	4.05E-15
8-Oct-88	15-Oct-88	4.26E-15
15-Oct-88	22-Oct-88	4.50E-15
22-Oct-88	28-Oct-88	3.35E-15
28-Oct-88	5-Nov-88	5.05E-15
5-Nov-88	14-Nov-88	6.05E-15
14-Nov-88	19-Nov-88	6.65E-15
7-Jan-88	14-Jan-88	0.00E+00
31-Jan-88	6-Feb-88	3.60E-15
6-Feb-88	12-Feb-88	1.18E-14
11-Feb-88	18-Feb-88	5.40E-15
18-Feb-88	25-Feb-88	2.97E-15
25-Feb-88	3-Mar-88	7.05E-16

Note: Alpha activity of 0 indicates result less than MDA

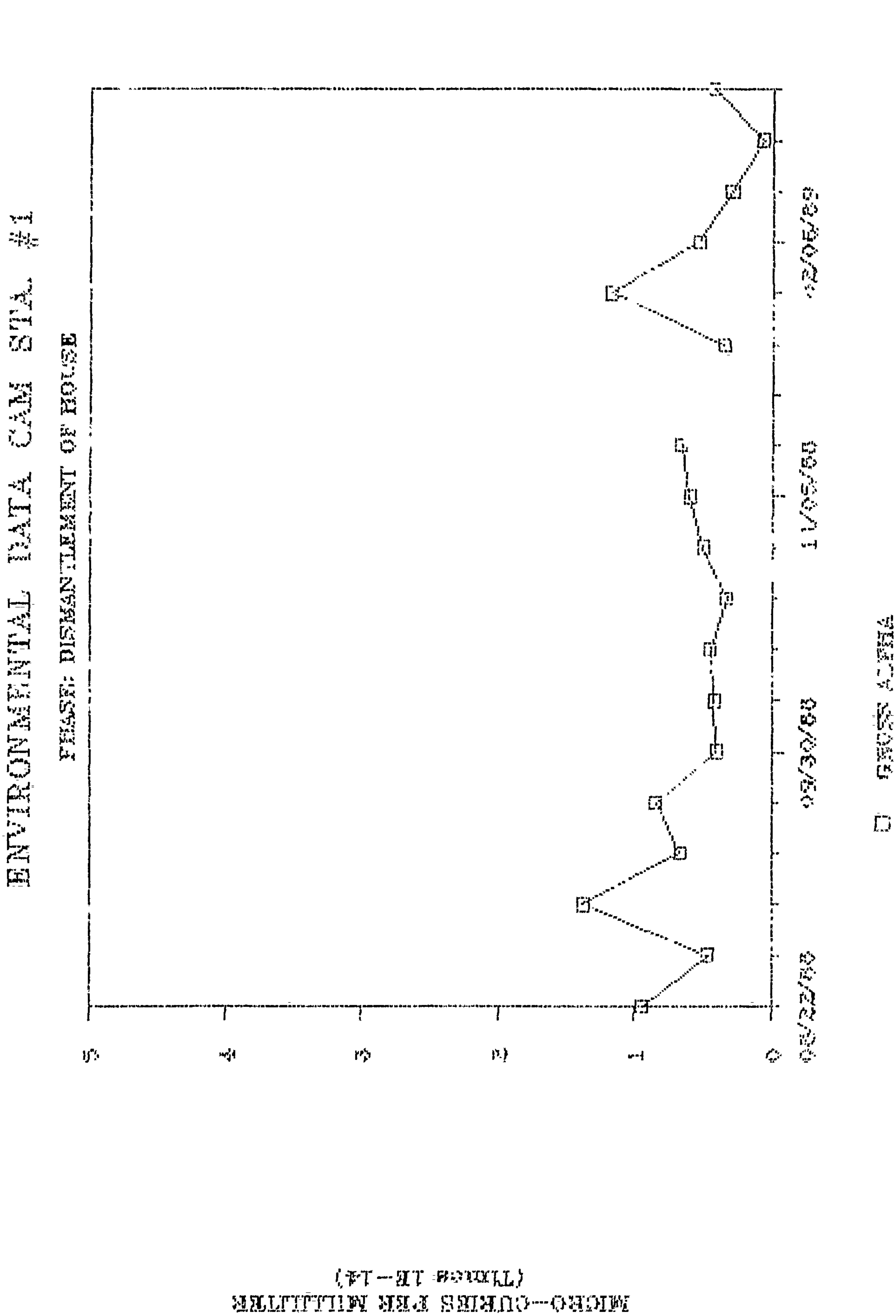


FIGURE H.3 ENVIRONMENTAL DATA - CAM STATION #1

ENVIRONMENTAL DATA FOR CAM STATION #2

PHASE: DISMANTLEMENT OF HOUSE

Sample ID	Location	Samp In	Samp Out	Alpha (μCi/ml)
LD-APE-0004	02	22-Aug-88	3-Sep-88	5.27E-15
LD-APE-0003	12	22-Aug-88	3-Sep-88	3.16E-15
LD-APE-0009	02	3-Sep-88	10-Sep-88	2.16E-15
LD-APE-0010	12	3-Sep-88	10-Sep-88	3.59E-15
LD-APE-0017	02	10-Sep-88	17-Sep-88	1.06E-14
LD-APE-0018	12	10-Sep-88	17-Sep-88	2.05E-15
LD-APE-0025	02	17-Sep-88	24-Sep-88	8.30E-15
LD-APE-0026	12	17-Sep-88	24-Sep-88	3.96E-15
LD-APE-0034	02	24-Sep-88	30-Sep-88	1.10E-14
LD-APE-0035	12	24-Sep-88	30-Sep-88	7.10E-15
LD-APE-0046	02	30-Sep-88	8-Oct-88	7.80E-15
LD-APE-0047	12	30-Sep-88	8-Oct-88	5.90E-15
LD-APE-0054	02	8-Oct-88	15-Oct-88	4.20E-15
LD-APE-0055	12	8-Oct-88	15-Oct-88	3.90E-15
LD-APE-0064	02	15-Oct-88	22-Oct-88	8.80E-15
LD-APE-0065	12	15-Oct-88	22-Oct-88	3.40E-15
LD-APE-0073	02	22-Oct-88	28-Oct-88	3.20E-15
LD-APE-0074	12	22-Oct-88	28-Oct-88	7.60E-15
LD-APE-0082	02	28-Oct-88	5-Nov-88	1.10E-14
LD-APE-0083	12	28-Oct-88	5-Nov-88	7.40E-15
LD-APE-0092	02	5-Nov-88	14-Nov-88	6.30E-15
LD-APE-0093	12	5-Nov-88	14-Nov-88	5.00E-15
LD-APE-0101	02	14-Nov-88	19-Nov-88	7.50E-15
LD-APE-0102	12	14-Nov-88	19-Nov-88	1.10E-14
LD-APE-0167	02	7-Jan-88	14-Jan-88	5.10E-15
LD-APE-0168	12	7-Jan-88	14-Jan-88	2.80E-15
LD-APE-0196	02	31-Jan-88	6-Feb-88	3.19E-15
LD-APE-0195	12	31-Jan-88	6-Feb-88	4.14E-16
LD-APE-0203	02	6-Feb-88	12-Feb-88	4.77E-15
LD-APE-0204	12	6-Feb-88	12-Feb-88	7.90E-16
LD-APE-0220	02	11-Feb-88	18-Feb-88	4.61E-15
LD-APE-0221	12	11-Feb-88	18-Feb-88	0.00E+00
LD-APE-0229	02	18-Feb-88	25-Feb-88	1.07E-14
LD-APE-0230	12	18-Feb-88	25-Feb-88	4.19E-15
LD-APE-0238	02	25-Feb-88	3-Mar-88	8.67E-15
LD-APE-0239	12	25-Feb-88	3-Mar-88	2.83E-15

Note: Alpha activity of 0 indicates result less than MDA

WEEKLY AVERAGES FOR CAM STATION #2

PHASE: DISMANTLEMENT OF HOUSE

Start date	Stop date	Average Alpha Activity (µCi/ml)
22-Aug-88	3-Sep-88	4.21E-15
3-Sep-88	10-Sep-88	2.88E-15
10-Sep-88	17-Sep-88	6.32E-15
17-Sep-88	24-Sep-88	6.13E-15
24-Sep-88	30-Sep-88	9.05E-15
30-Sep-88	8-Oct-88	6.85E-15
8-Oct-88	15-Oct-88	4.05E-15
15-Oct-88	22-Oct-88	6.10E-15
22-Oct-88	28-Oct-88	5.40E-15
28-Oct-88	5-Nov-88	9.20E-15
5-Nov-88	14-Nov-88	5.65E-15
14-Nov-88	19-Nov-88	9.25E-15
19-Nov-88	7-Jan-88	0.00E+00
7-Jan-88	14-Jan-88	3.95E-15
31-Jan-88	6-Feb-88	1.80E-15
6-Feb-88	12-Feb-88	2.78E-15
11-Feb-88	18-Feb-88	2.31E-15
18-Feb-88	25-Feb-88	7.45E-15
25-Feb-88	3-Mar-88	5.75E-15

Note: Alpha activity of 0 indicates result less than MDA

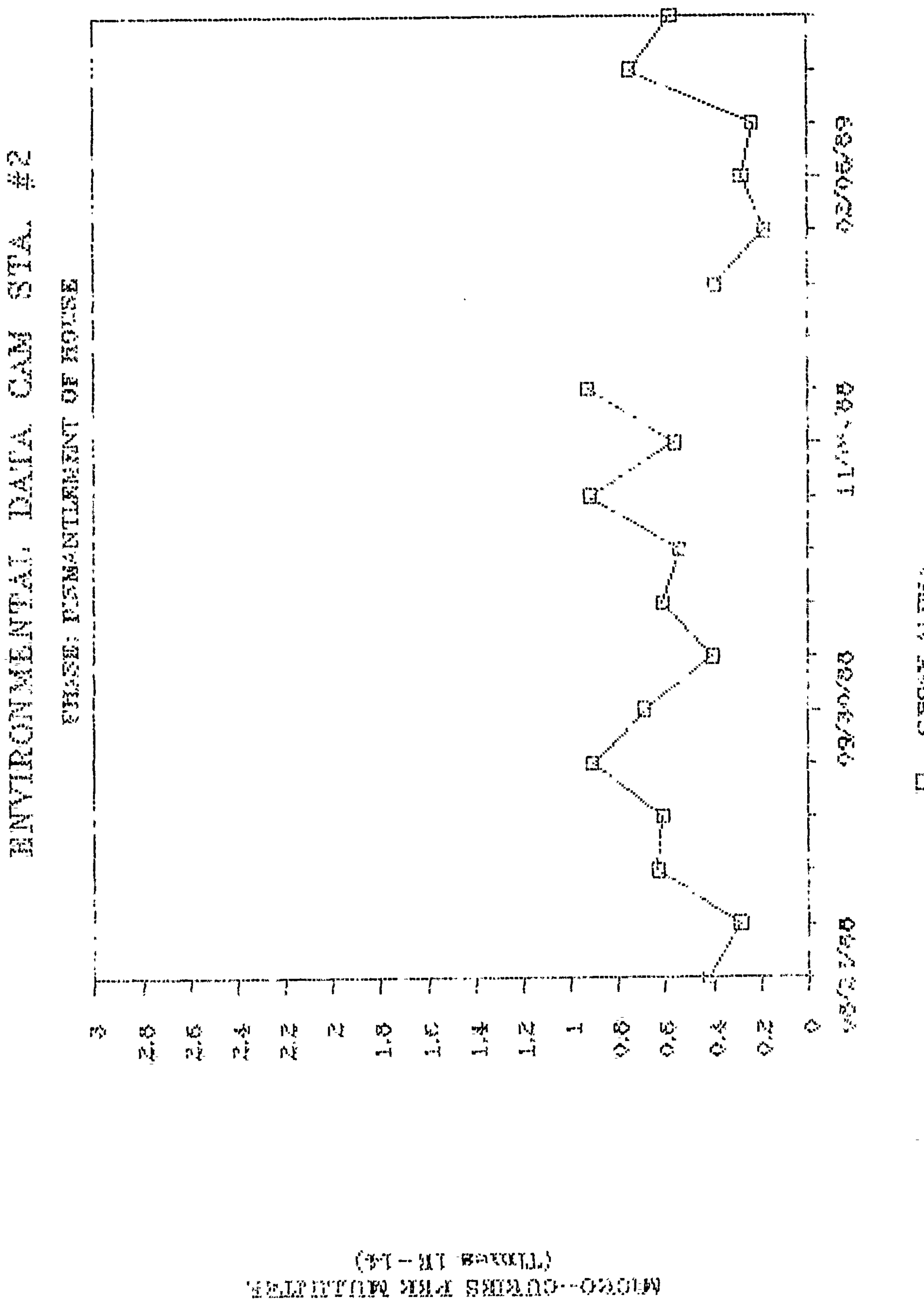


FIGURE H.4 ENVIRONMENTAL DATA - CAM STATION #2

ENVIRONMENTAL DATA FOR CAM STATION #3

PHASE: DISMANTLEMENT OF HOUSE

Sample ID	Location	Samp In	Samp Out	Alpha (µCi/ml)
LD-APE-0005	03	22-Aug-88	3-Sep-88	4.21E-15
LD-APE-0006	13	22-Aug-88	3-Sep-88	5.80E-15
LD-APE-0011	03	3-Sep-88	10-Sep-88	3.49E-15
LD-APE-0019	13	10-Sep-88	17-Sep-88	8.22E-15
LD-APE-0027	03	17-Sep-88	24-Sep-88	3.59E-15
LD-APE-0028	13	22-Sep-88	24-Sep-88	5.02E-14
LD-APE-0036	03	24-Sep-88	30-Sep-88	9.50E-15
LD-APE-0037	13	24-Sep-88	30-Sep-88	3.60E-15
LD-APE-0048	03	30-Sep-88	8-Oct-88	4.00E-14
LD-APE-0049	13	30-Sep-88	8-Oct-88	8.70E-15
LD-APE-0056	03	8-Oct-88	15-Oct-88	3.30E-15
LD-APE-0057	13	8-Oct-88	15-Oct-88	1.20E-14
LD-APE-0066	03	15-Oct-88	22-Oct-88	6.80E-15
LD-APE-0067	13	15-Oct-88	22-Oct-88	9.20E-15
LD-APE-0075	03	22-Oct-88	28-Oct-88	4.70E-15
LD-APE-0076	13	22-Oct-88	28-Oct-88	4.50E-15
LD-APE-0084	03	28-Oct-88	5-Nov-88	9.20E-15
LD-APE-0085	13	28-Oct-88	5-Nov-88	6.50E-15
LD-APE-0094	03	5-Nov-88	14-Nov-88	7.10E-15
LD-APE-0095	13	5-Nov-88	14-Nov-88	7.00E-15
LD-APE-0103	03	14-Nov-88	19-Nov-88	1.40E-14
LD-APE-0104	13	14-Nov-88	19-Nov-88	1.20E-14
LD-APE-0169	03	7-Jan-88	14-Jan-88	1.00E-15
LD-APE-0170	13	7-Jan-88	14-Jan-88	5.10E-15
LD-APE-0193	13	31-Jan-88	6-Feb-88	9.22E-16
LD-APE-0194	03	31-Jan-88	6-Feb-88	2.07E-15
LD-APE-0205	03	6-Feb-88	12-Feb-88	7.10E-15
LD-APE-0206	13	6-Feb-88	12-Feb-88	0.00E+00
LD-APE-0222	03	11-Feb-88	18-Feb-88	7.31E-15
LD-APE-0223	13	11-Feb-88	18-Feb-88	1.66E-15
LD-APE-0231	03	18-Feb-88	25-Feb-88	1.41E-14
LD-APE-0232	13	18-Feb-88	25-Feb-88	2.44E-14
LD-APE-0240	03	25-Feb-88	3-Mar-88	1.64E-14
LD-APE-0241	13	25-Feb-88	3-Mar-88	7.30E-15

Note: Alpha activity of 0 indicates result less than MDA

WEEKLY AVERAGES FOR CAM STATION #3

PHASE: DISMANTLEMENT OF HOUSE

Start date	Stop date	Average Alpha Activity (μCi/ml)
22-Aug-88	3-Sep-88	5.00E-15
3-Sep-88	10-Sep-88	3.49E-15
10-Sep-88	17-Sep-88	8.22E-15
17-Sep-88	24-Sep-88	3.59E-15
22-Sep-88	24-Sep-88	5.02E-14
24-Sep-88	30-Sep-88	6.55E-15
30-Sep-88	8-Oct-88	2.44E-14
8-Oct-88	15-Oct-88	7.65E-15
15-Oct-88	22-Oct-88	8.00E-15
22-Oct-88	28-Oct-88	4.60E-15
28-Oct-88	5-Nov-88	7.85E-15
5-Nov-88	14-Nov-88	7.05E-15
14-Nov-88	19-Nov-88	1.30E-14
19-Nov-88	7-Jan-88	0.00E+00
7-Jan-88	14-Jan-88	3.05E-15
31-Jan-88	6-Feb-88	1.50E-15
6-Feb-88	12-Feb-88	3.55E-15
11-Feb-88	18-Feb-88	4.49E-15
18-Feb-88	25-Feb-88	1.92E-14
25-Feb-88	3-Mar-88	1.19E-14

Note: Alpha activity of 0 indicates result less than MDA

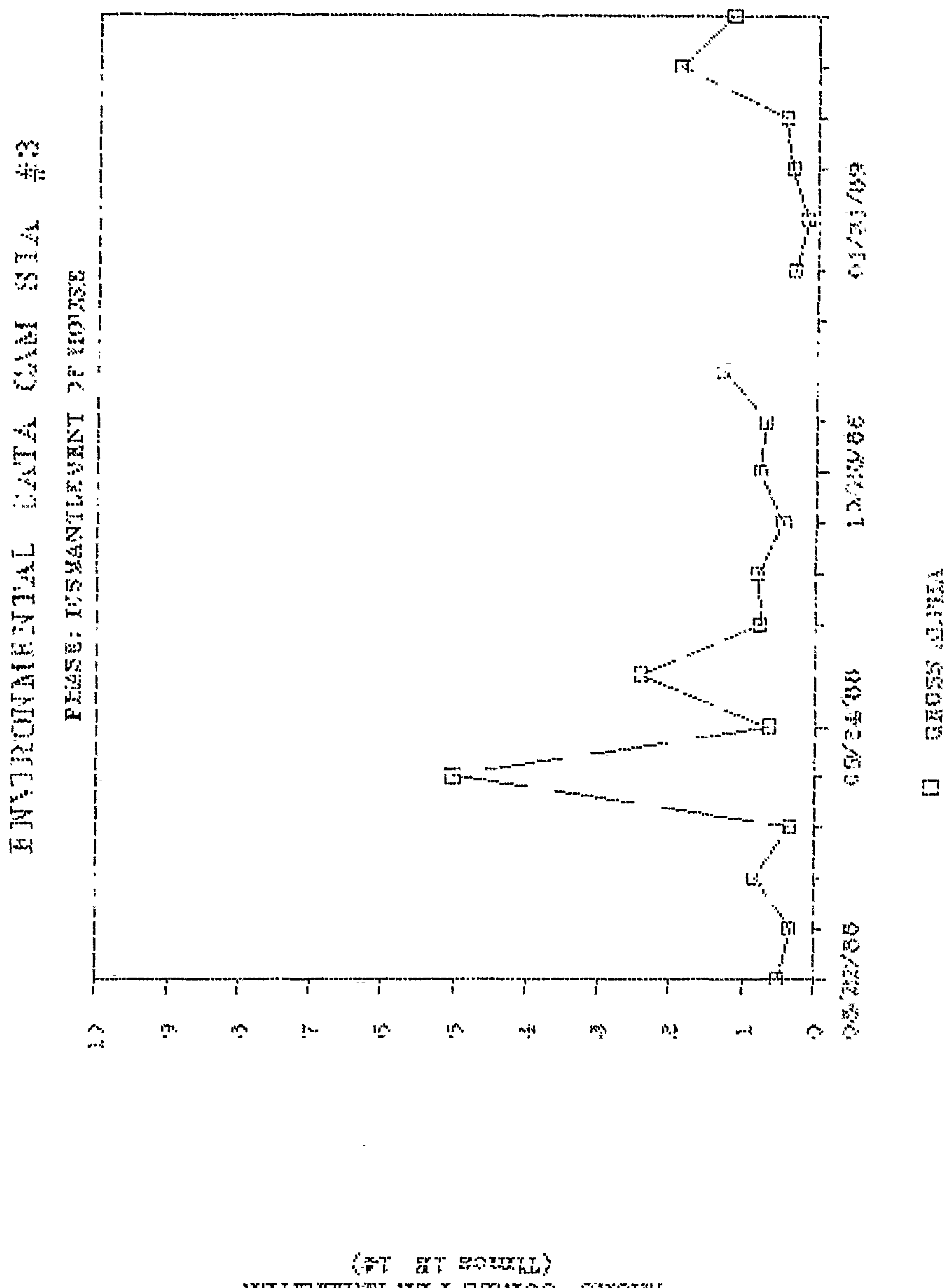


FIGURE H.5 ENVIRONMENTAL DATA - CAM STATION #3

ENVIRONMENTAL DATA FOR CAM STATION #4

PHASE: DISMANTLEMENT OF HOUSE

Sample ID	Location	Samp In	Samp Out	Alpha (μCi/ml)
LD-APE-0012	04	3-Sep-88	10-Sep-88	1.44E-15
LD-APE-0013	04	3-Sep-88	10-Sep-88	3.95E-15
LD-APE-0020	04	10-Sep-88	17-Sep-88	4.45E-15
LD-APE-0021	14	10-Sep-88	17-Sep-88	2.05E-15
LD-APE-0029	04	17-Sep-88	24-Sep-88	2.51E-15
LD-APE-0030	14	17-Sep-88	24-Sep-88	2.15E-15
LD-APE-0038	04	24-Sep-88	30-Sep-88	7.10E-15
LD-APE-0039	14	24-Sep-88	30-Sep-88	7.80E-15
LD-APE-0050	14	30-Sep-88	8-Oct-88	1.90E-15
LD-APE-0051	04	30-Sep-88	8-Oct-88	4.30E-15
LD-APE-0058	04	8-Oct-88	15-Oct-88	4.70E-15
LD-APE-0059	14	8-Oct-88	15-Oct-88	5.70E-15
LD-APE-0068	04	15-Oct-88	22-Oct-88	1.50E-15
LD-APE-0069	14	15-Oct-88	22-Oct-88	6.70E-15
LD-APE-0077	04	22-Oct-88	28-Oct-88	3.00E-15
LD-APE-0078	14	22-Oct-88	28-Oct-88	7.20E-15
LD-APE-0087	04	28-Oct-88	5-Nov-88	8.20E-15
LD-APE-0088	14	28-Oct-88	5-Nov-88	9.20E-15
LD-APE-0096	04	5-Nov-88	14-Nov-88	1.30E-14
LD-APE-0097	14	5-Nov-88	14-Nov-88	8.20E-15
LD-APE-0105	04	14-Nov-88	19-Nov-88	1.50E-14
LD-APE-0106	14	14-Nov-88	19-Nov-88	9.10E-15
LD-APE-0171	04	7-Jan-88	14-Jan-88	4.00E-15
LD-APE-0172	14	7-Jan-88	14-Jan-88	5.50E-15
LD-APE-0191	14	31-Jan-88	6-Feb-88	2.30E-15
LD-APE-0192	04	31-Jan-88	6-Feb-88	1.26E-15
LD-APE-0207	04	6-Feb-88	12-Feb-88	9.51E-15
LD-APE-0208	14	6-Feb-88	12-Feb-88	6.34E-15
LD-APE-0224	04	11-Feb-88	18-Feb-88	5.59E-15
LD-APE-0225	14	11-Feb-88	18-Feb-88	2.30E-15
LD-APE-0233	04	18-Feb-88	25-Feb-88	0.00E+00
LD-APE-0234	14	18-Feb-88	25-Feb-88	2.68E-15
LD-APE-0242	04	25-Feb-88	3-Mar-88	7.34E-15
LD-APE-0243	14	25-Feb-88	3-Mar-88	0.00E+00

Note: Alpha activity of 0 indicates result less than MDA

WEEKLY AVERAGES FOR CAM STATION #4

PHASE: DISMANTLEMENT OF HOUSE

Start date	Stop date	Average Alpha Activity (μCi/ml)
3-Sep-88	10-Sep-88	2.70E-15
10-Sep-88	17-Sep-88	3.25E-15
17-Sep-88	24-Sep-88	2.33E-15
24-Sep-88	30-Sep-88	7.45E-15
30-Sep-88	8-Oct-88	3.10E-15
8-Oct-88	15-Oct-88	5.20E-15
15-Oct-88	22-Oct-88	4.10E-15
22-Oct-88	28-Oct-88	5.10E-15
28-Oct-88	5-Nov-88	8.70E-15
5-Nov-88	14-Nov-88	1.11E-14
14-Nov-88	19-Nov-88	1.16E-14
19-Nov-88	7-Jan-88	0.00E+00
7-Jan-88	14-Jan-88	6.55E-15
31-Jan-88	6-Feb-88	3.90E-15
6-Feb-88	12-Feb-88	5.39E-15
11-Feb-88	18-Feb-88	5.96E-15
18-Feb-88	25-Feb-88	1.15E-15
25-Feb-88	3-Mar-88	5.01E-15

Note: Alpha activity of 0 indicates result less than MDA

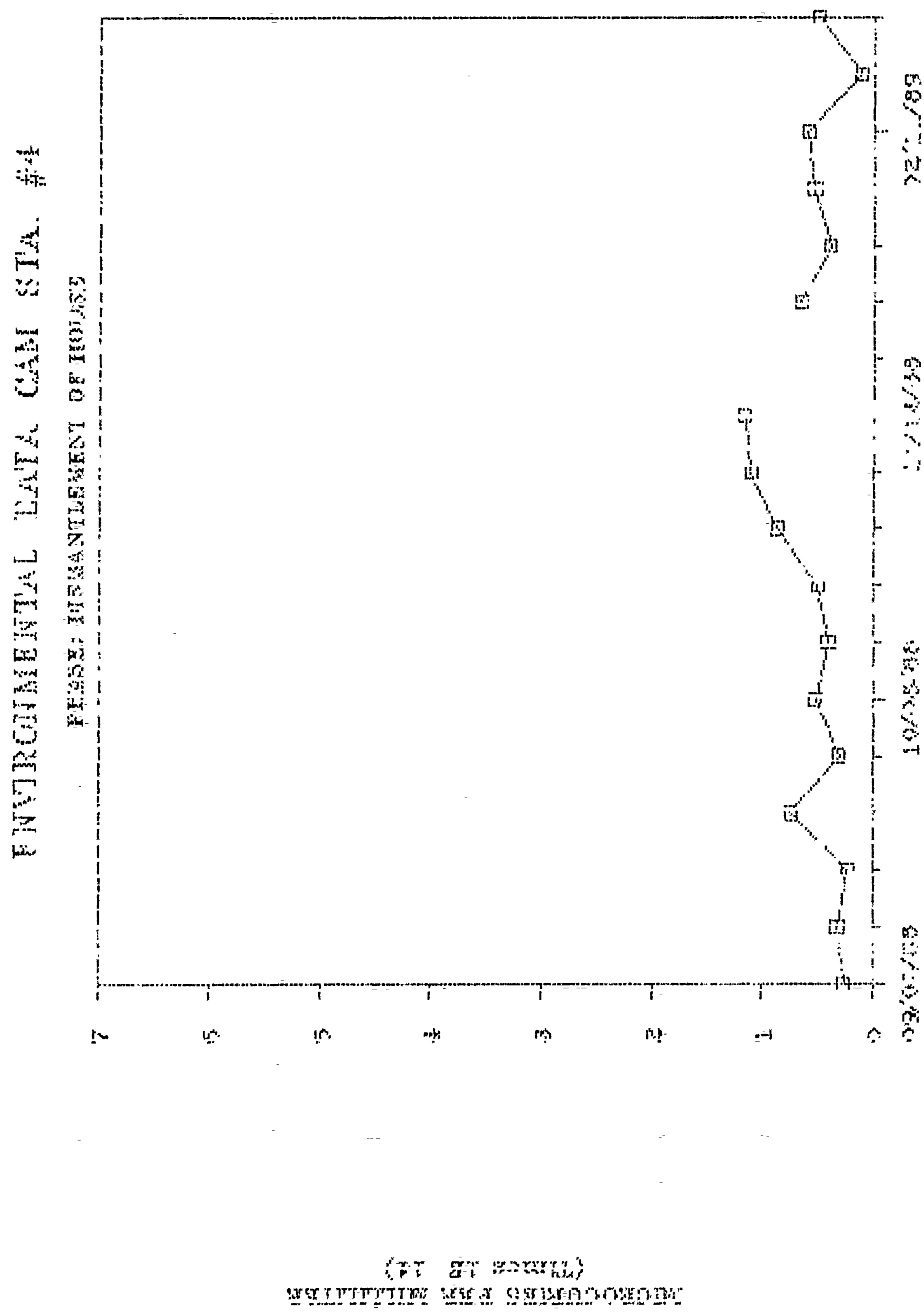


FIGURE H.6 ENVIRONMENTAL DATA - CAM STATION #4

ENVIRONMENTAL RADON PROGENY DATA (WORKING LEVELS)

PHASE: DISMANTLEMENT OF HOUSE

Sample ID	Date	Location	Time	Conc. (WL)
LD-WLE-0167	10-Jan-88	CAM STA #1	732	1.15E-03
LD-WLE-0168	11-Jan-88	CAM STA #1	654	1.07E-03
LD-WLE-0170	11-Jan-88	CAM STA #1	1505	5.08E-04

Average per sub-phase: 9.09E-04 WL

Sample ID	Date	Location	Time	Conc. (WL)
LD-WLE-0233	1-Feb-88	CAM STA #1	730	1.10E-03
LD-WLE-0235	1-Feb-88	CAM STA #1	1245	8.70E-04
LD-WLE-0237	2-Feb-88	CAM STA #1	720	1.20E-03
LD-WLE-0239	2-Feb-88	CAM STA #1	1517	1.00E-03
LD-WLE-0241	6-Feb-88	CAM STA #1	738	2.30E-04
LD-WLE-0243	6-Feb-88	CAM STA #1	1406	2.50E-03
LD-WLE-0245	7-Feb-88	CAM STA #1	827	1.00E-03
LD-WLE-0247	7-Feb-88	CAM STA #1	1530	6.80E-04
LD-WLE-0250	8-Feb-88	CAM STA #1	954	6.21E-04
LD-WLE-0251	8-Feb-88	CAM STA #1	1414	3.39E-04
LD-WLE-0254	9-Feb-88	CAM STA #1	947	9.14E-04
LD-WLE-0255	9-Feb-88	CAM STA #1	1322	3.95E-04
LD-WLE-0258	10-Feb-88	CAM STA #1	1125	1.19E-03

Average per sub-phase: 9.26E-04 WL

Sample ID	Date	Location	Time	Conc. (WL)
LD-WLE-0262	11-Feb-88	CAM STA #1	1007	2.62E-03
LD-WLE-0264	11-Feb-88	CAM STA #1	1242	1.23E-03
LD-WLE-0266	13-Feb-88	CAM STA #1	944	8.47E-04
LD-WLE-0267	13-Feb-88	CAM STA #1	1342	6.21E-04
LD-WLE-0270	14-Feb-88	CAM STA #1	950	3.73E-03
LD-WLE-0271	14-Feb-88	CAM STA #1	1533	3.61E-03
LD-WLE-0274	15-Feb-88	CAM STA #1	745	6.32E-03
LD-WLE-0275	15-Feb-88	CAM STA #1	1351	1.81E-03
LD-WLE-0276	15-Feb-88	CAM STA #6	1620	2.50E-02
LD-WLE-0278	16-Feb-88	CAM STA #1	955	9.54E-04
LD-WLE-0280	16-Feb-88	CAM STA #1	1405	6.50E-04
LD-WLE-0282	17-Feb-88	CAM STA #1	1250	1.02E-03
LD-WLE-0283	17-Feb-88	CAM STA #1	1330	4.52E-04
LD-WLE-0284	18-Feb-88	CAM STA #1	1407	1.19E-03
LD-WLE-0285	18-Feb-88	CAM STA #6	1510	1.20E-02
LD-WLE-0286	18-Feb-88	CAM STA #1	1525	1.69E-04
LD-WLE-0288	20-Feb-88	CAM STA #1	840	2.33E-04
LD-WLE-0289	20-Feb-88	CAM STA #1	1254	9.50E-04
LD-WLE-0291	22-Feb-88	CAM STA #6	940	9.48E-04
LD-WLE-0292	22-Feb-88	CAM STA #1	1100	2.37E-03
LD-WLE-0295	23-Feb-88	CAM STA #1	1505	1.98E-03
LD-WLE-0298	24-Feb-88	SOUTH OSF	800	2.84E-03

ENVIRONMENTAL RADON PROGENY DATA (WORKING LEVELS)

PHASE: DISMANTLEMENT OF HOUSE

Sample ID	Date	Location	Time	Conc. (WL)
LD-WLE-0300	24-Feb-88	SOUTH OSF	1510	1.19E-03
LD-WLE-0302	25-Feb-88	SOUTH OSF	943	1.24E-03
LD-WLE-0304	25-Feb-88	SOUTH OSF	1541	6.80E-03
LD-WLE-0305	27-Feb-88	SOUTH OSF	1505	4.96E-03
LD-WLE-0307	28-Feb-88	SOUTH OF OSF	1240	6.50E-03
LD-WLE-0309	28-Feb-88	SOUTH OSF	1342	9.80E-03

Average per sub-phase: 3.64E-03 WL

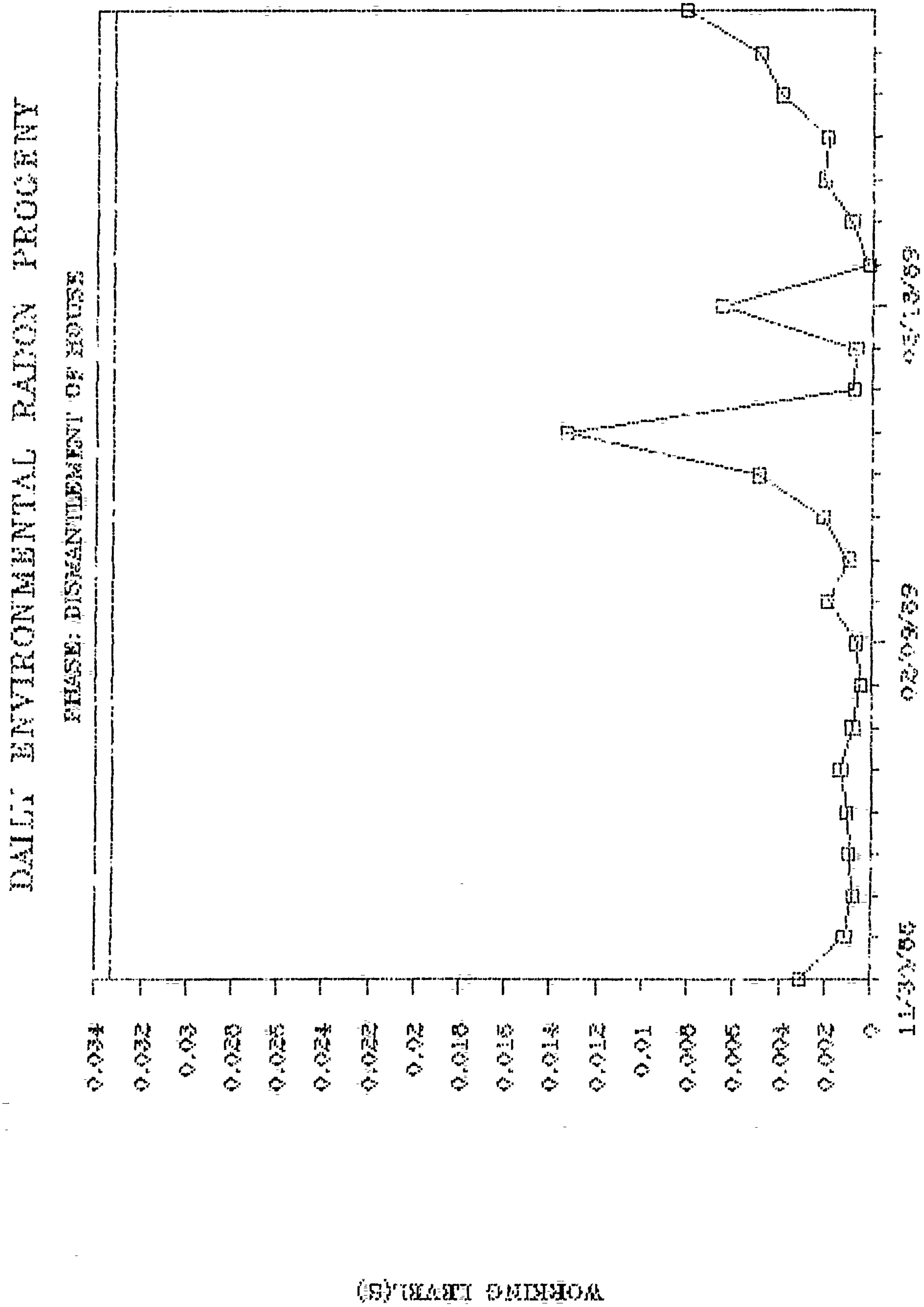


FIGURE H.7 DAILY WL CONCENTRATIONS

APPENDIX 4-C

SUMMARY OF PHASE HAZARD ANALYSES AND SAFETY TOPICS

SUMMARY OF PHASE HAZARD ANALYSES AND HEALTH AND SAFETY TOPICS

PHASE: DISMANTLEMENT OF PRIMARY STRUCTURE

PHASE HAZARD ANALYSIS SUMMARY FOR INTERIOR/EXTERIOR DISMANTLEMENT OPERATIONS

August 17, 1988, PROJECT PHASE: First Entry and Inspection of the Structure's Interior. SUMMARY: Operation conducted to determine structural integrity, containment requirements, identification of radiological and non-radiological hazards.

August 17, 1988, PROJECT PHASE: Initial operations on the structure's Exterior. SUMMARY: Installation of anchorage system for safety lines and roof jacks.

August 17, 1988, PROJECT PHASE: Preparation of Chimney Containment Systems and Sealing Interior of the Structure. SUMMARY: Installation of roof mounted chimney containment systems and activation of HEPA units within the structure.

August 23, 1988, PROJECT PHASE: Continuous Operations Requiring Entry to the Structure and Dismantlement of the Third Floor Interior and Chimney above the Roof Line on 105 East Stratford. SUMMARY: The operations consisted of the removal of all non-fixed items within the structure to include debris, dismantlement of the chimneys, and dismantlement of the third floor interior.

September 16, 1988, PROJECT PHASE: Demolition Operations North Chimney 107 East Stratford Avenue. SUMMARY: The operation consisted of the demolition of the north chimney to the roof line and installation of the HEPA unit.

September 21, 1988, PROJECT PHASE: Demolition Operation of the South Chimney 107 East Stratford. SUMMARY: The operation consisted of the demolition of the south chimney to the roof line and installation of the HEPA unit.

October 6, 1988, PROJECT PHASE: Exterior Dismantlement of 105/107 East Stratford. SUMMARY: The operations consisted of the dismantlement of the structure to the first level flooring. The operations were divided into three phases: roof and third level, second level, and finally the first level.

October 14, 1988, PROJECT PHASE: Addendum Number 1, Exterior Dismantlement of 105/107 East Stratford. SUMMARY: The addendum consisted of dismantlement of the three dormers on the 107 East Stratford side of the structure without a tarpaulin cover. The remaining openings were covered with 6 mil plastic sheeting.

October 25, 1988, PROJECT PHASE: Addendum Number 2, Exterior Dismantlement of 105/107 East Stratford. SUMMARY: The addendum consisted of modifying the dismantlement of the exterior walls to allow dismantlement as a unit for those wall sections located between doors and windows, dismantlement of the 107 East Stratford front and connecting side porch to be conducted in an open environment, and safety boots without covers was authorized for interior dismantlement activities provided they remain within the porch doffing area prior to leaving the control area.

November 8, 1989, PROJECT PHASE: Addendum Number 3, Exterior Dismantlement of 105/107 East Stratford. SUMMARY: The addendum consisted of modifying the dismantlement of the front and rear porches to allow dismantlement activities in an open environment.

January 9, 1989, PROJECT PHASE: Addendum Number 4, Exterior Dismantlement of 105/107 East Stratford. SUMMARY: The addendum consisted of modifying the dismantlement of the porches to include the adjoining concrete steps, hand rails, and sidewalks.

January 31, 1989, PROJECT PHASE: Basement and Foundation Dismantlement. SUMMARY: Dismantlement activities were preceded by terminating the fire suppression systems, removal of the 107 interior heating oil tank, furnaces, hot water tanks, and drums of mixed domestic chemical wastes from the structure. The 107 East Stratford basement and foundation was dismantled in an open environment with a rubble packaging area located near the 105 East Stratford Avenue driveway. The 105 East Stratford basement and foundation was dismantled in a HEPA ventilated containment system. All rubble packaging was conducted within a separate HEPA ventilated containment structure within the basement structure.

April 30, 1989, PROJECT PHASE: Addendum Number 1, Basement and Foundation Dismantlement. SUMMARY: The modification consisted of procedures for the removal of a 1,000 gallon underground heating oil storage tank which serviced the 105 East Stratford Avenue structure.

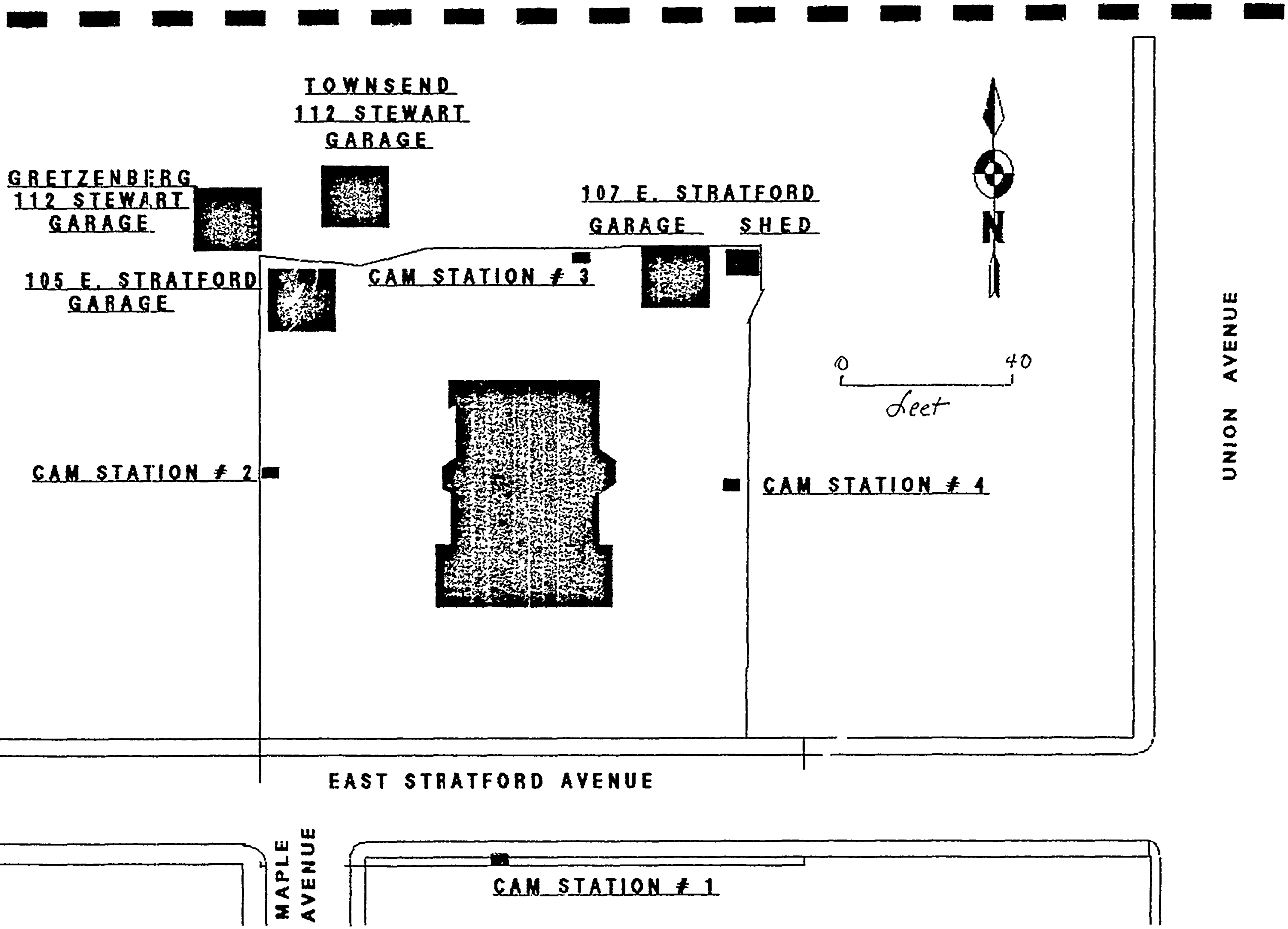
SUMMARY OF TOOL BOX SAFETY DISCUSSIONS
FOR
DISMANTLEMENT OF 105/107 EAST STRATFORD STRUCTURE

Topics Presented

1. Respiratory Protection Using Racal Airstream Helmets, AH3.
2. Safety Procedures Enforceable at Project Site.
3. Security Badge Procedures.
4. Phase Hazard Analysis and Worker Information.
5. Medical Monitoring Procedures.
6. Heat Stress Monitoring Procedures.
7. Emergency Medical Evacuation Procedures.
8. Tetanus Booster Immunizations.
9. First Aid Treatment Procedures.
10. Safety Violation Occurrence and Worker Discussion.
11. Procedures for Issue of Respiratory Protective Equipment.
12. Fire Extinguisher Utilization and Location of Units.
13. Fire Suppression System Operation Procedures for Structure.
14. Respiratory Protection Using Negative Pressure Facepieces.
15. Cold Stress Prevention.
16. Standing Operating Procedures for Respiratory Protection Program.
17. Safe Work Practices when Wearing Respiratory Protection Devices.

APPENDIX 4-D

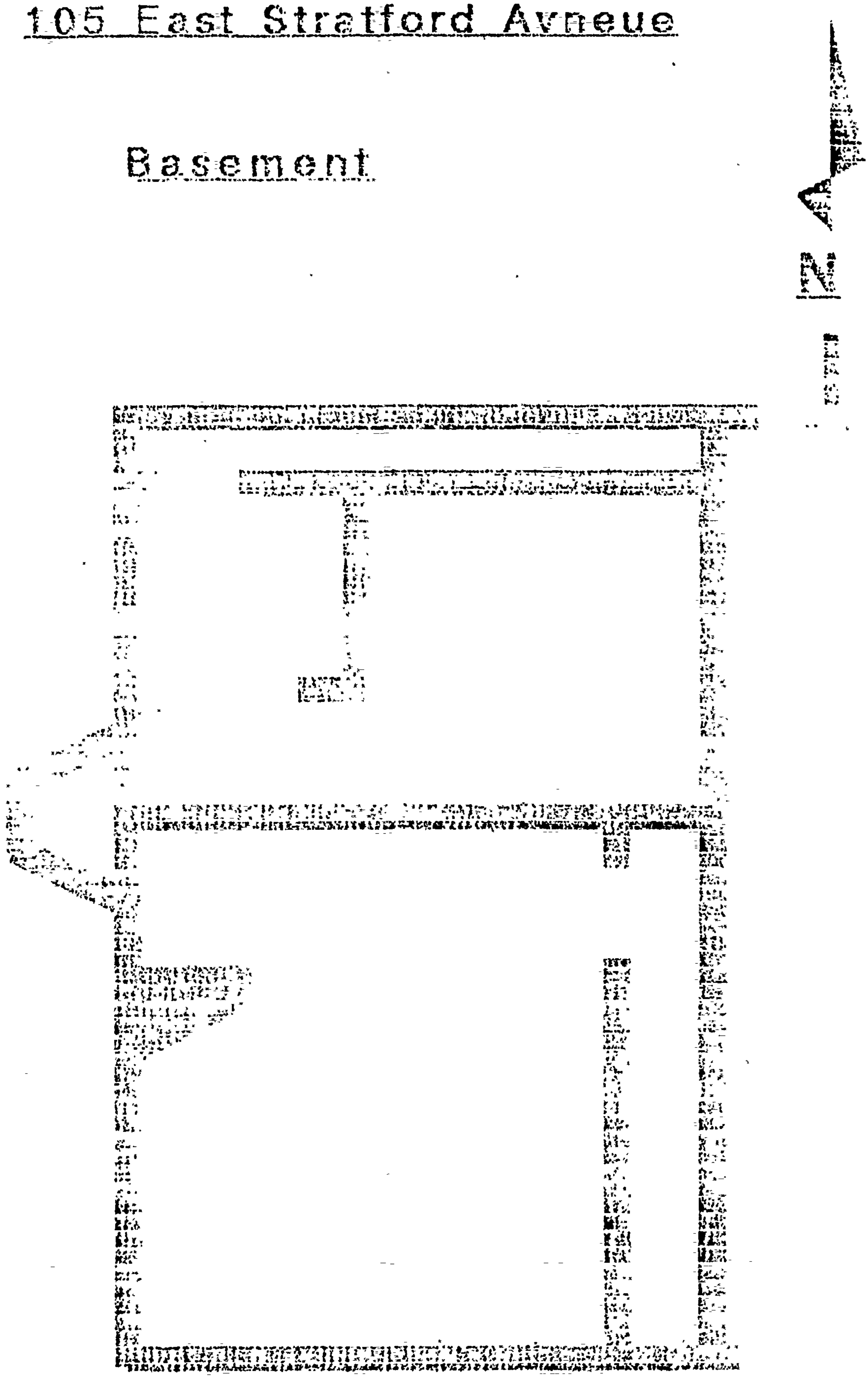
SITE MAPS



- CAM STATION LOCATIONS

105 East Stratford Avneue

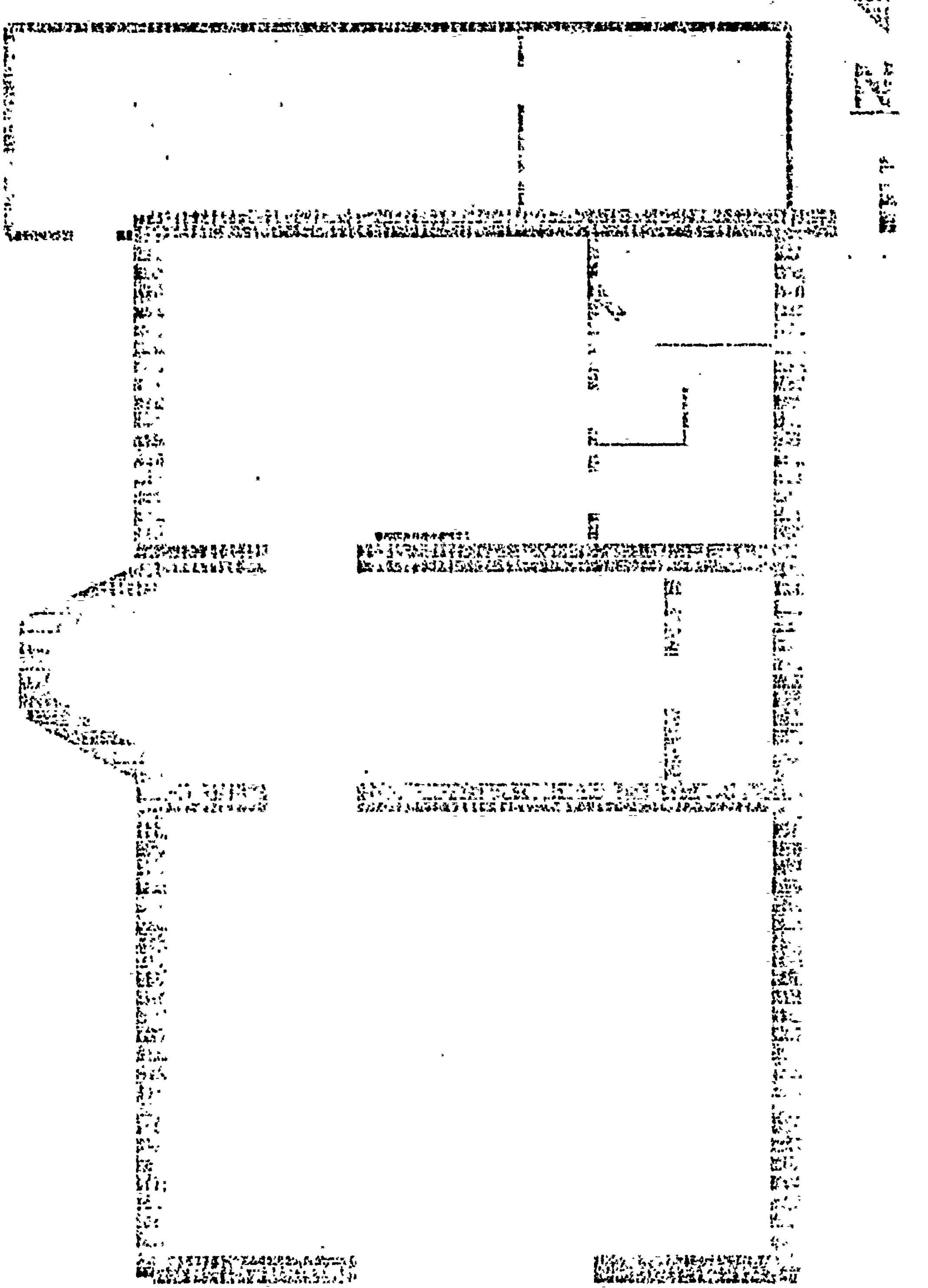
Basement



MAP J.2 - 105 EAST STRATFORD - BASEMENT

105 East Stratford Avneue

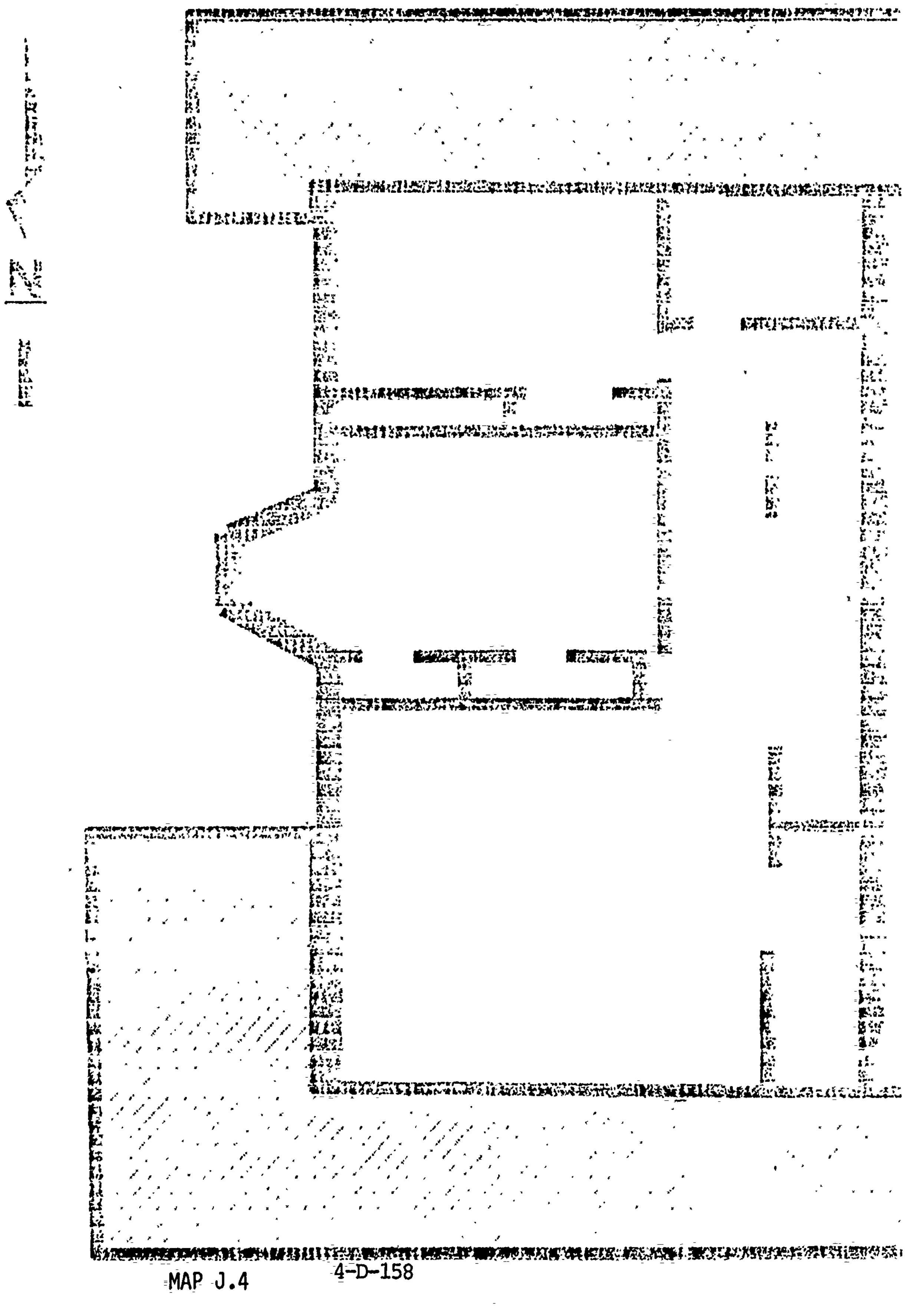
First Floor



MAP J.3 - 105 EAST STRATFORD - 1ST FLOOR

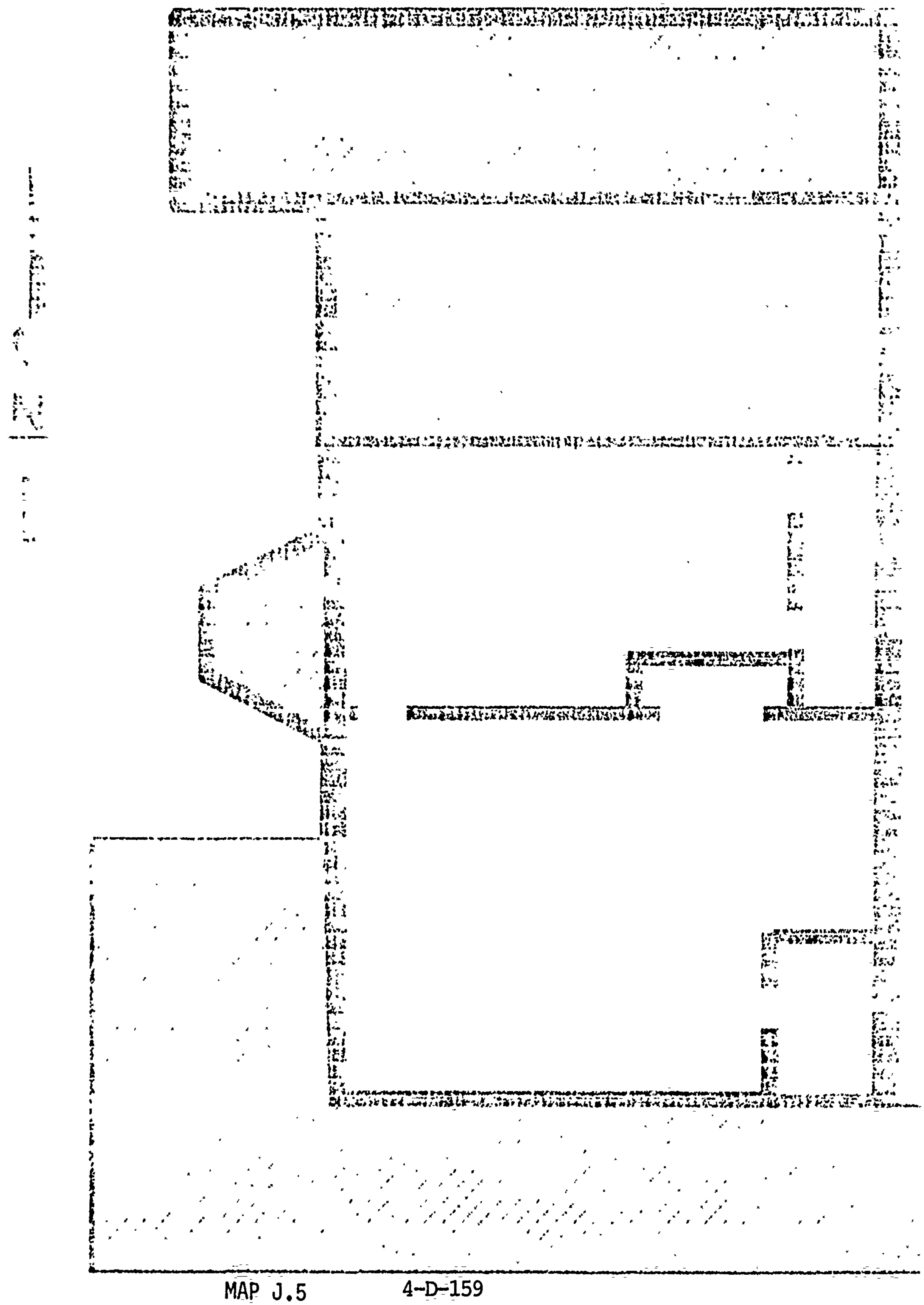
105 East Stratford Avneue

Second Floor



105 East Stratford Avneue

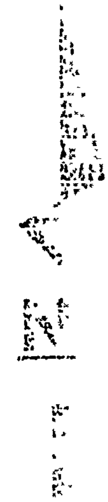
Third Floor

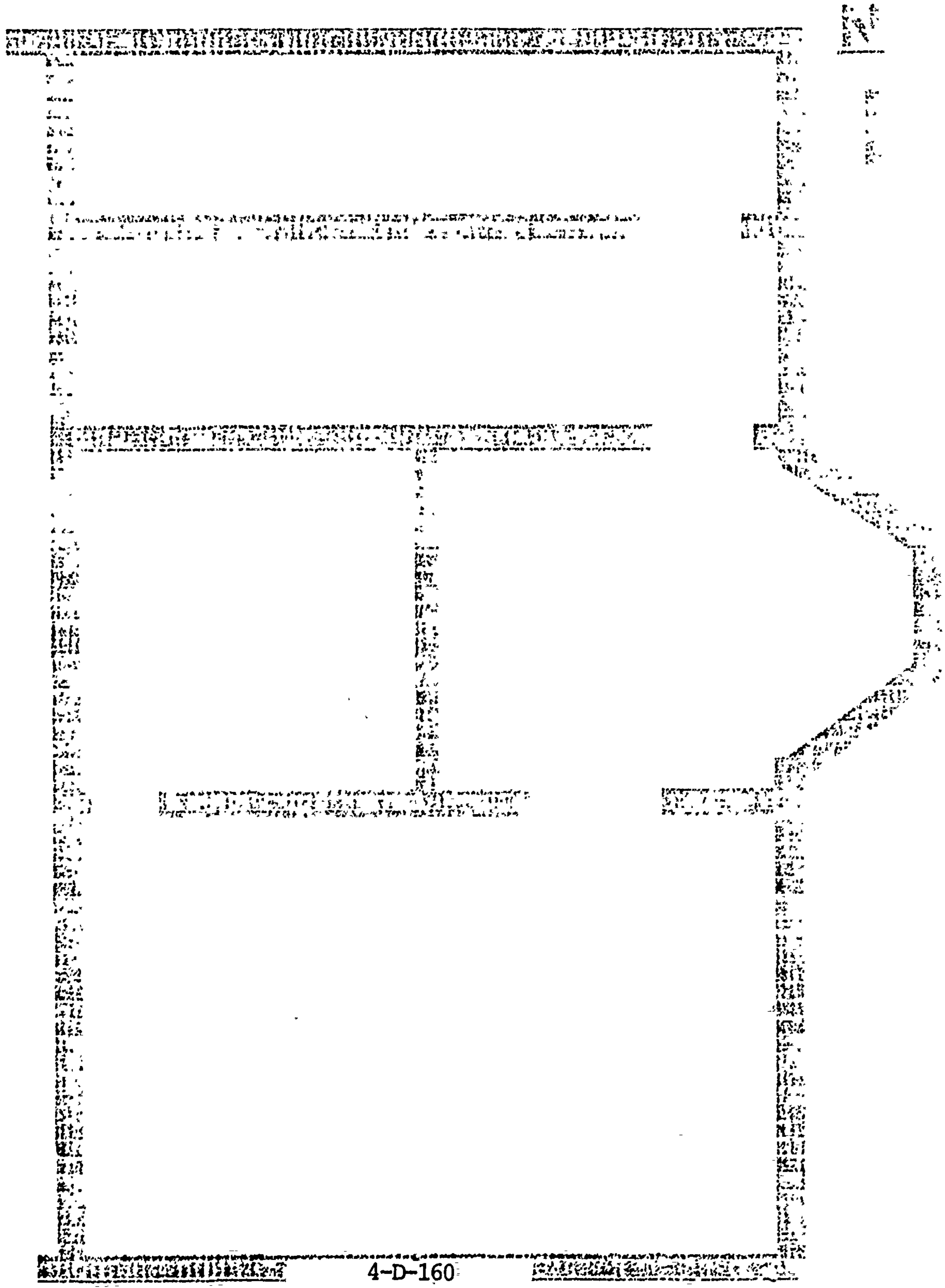


MAP J.5 4-D-159

107 East Stratford Avneue

Basement

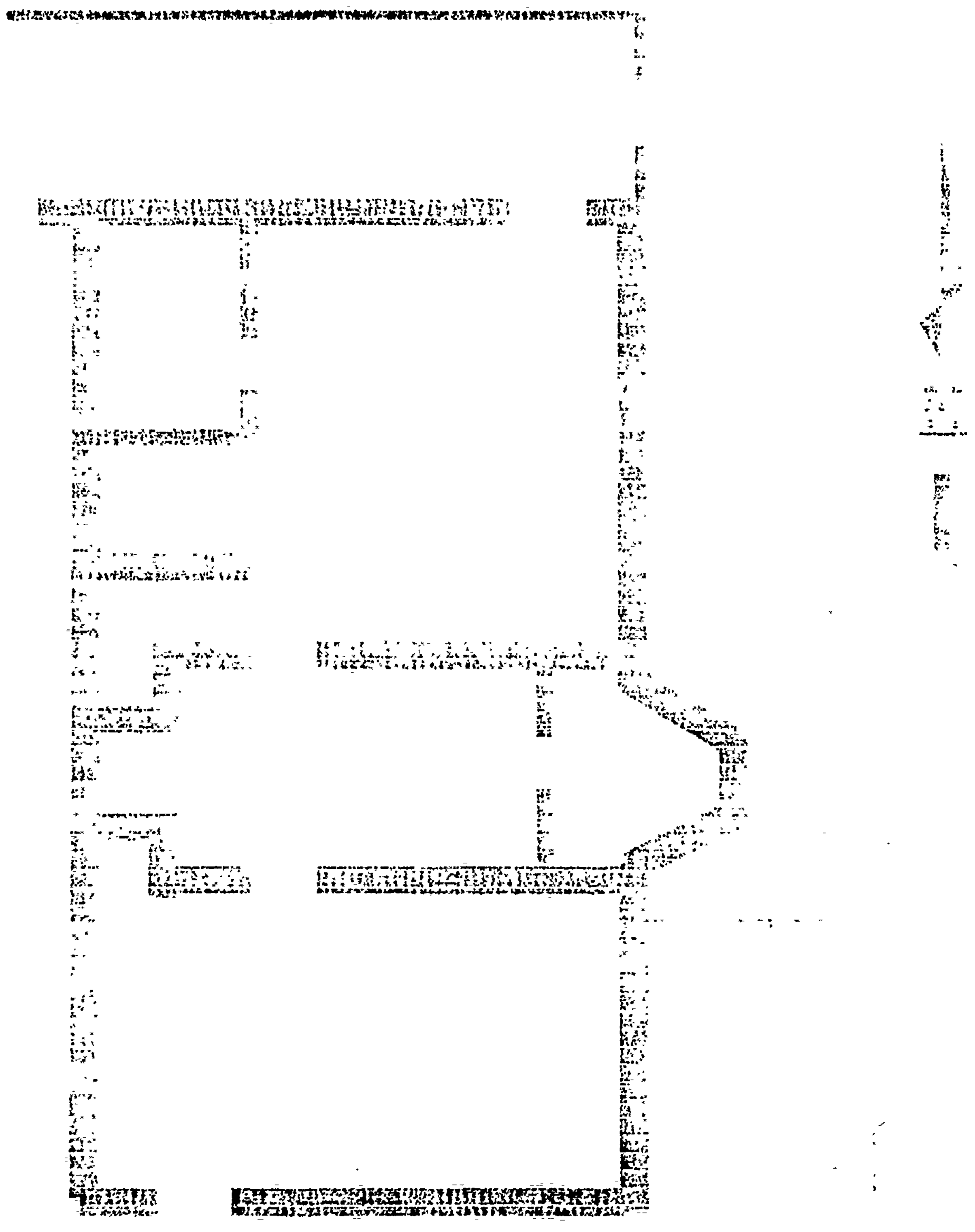




MAP J.6

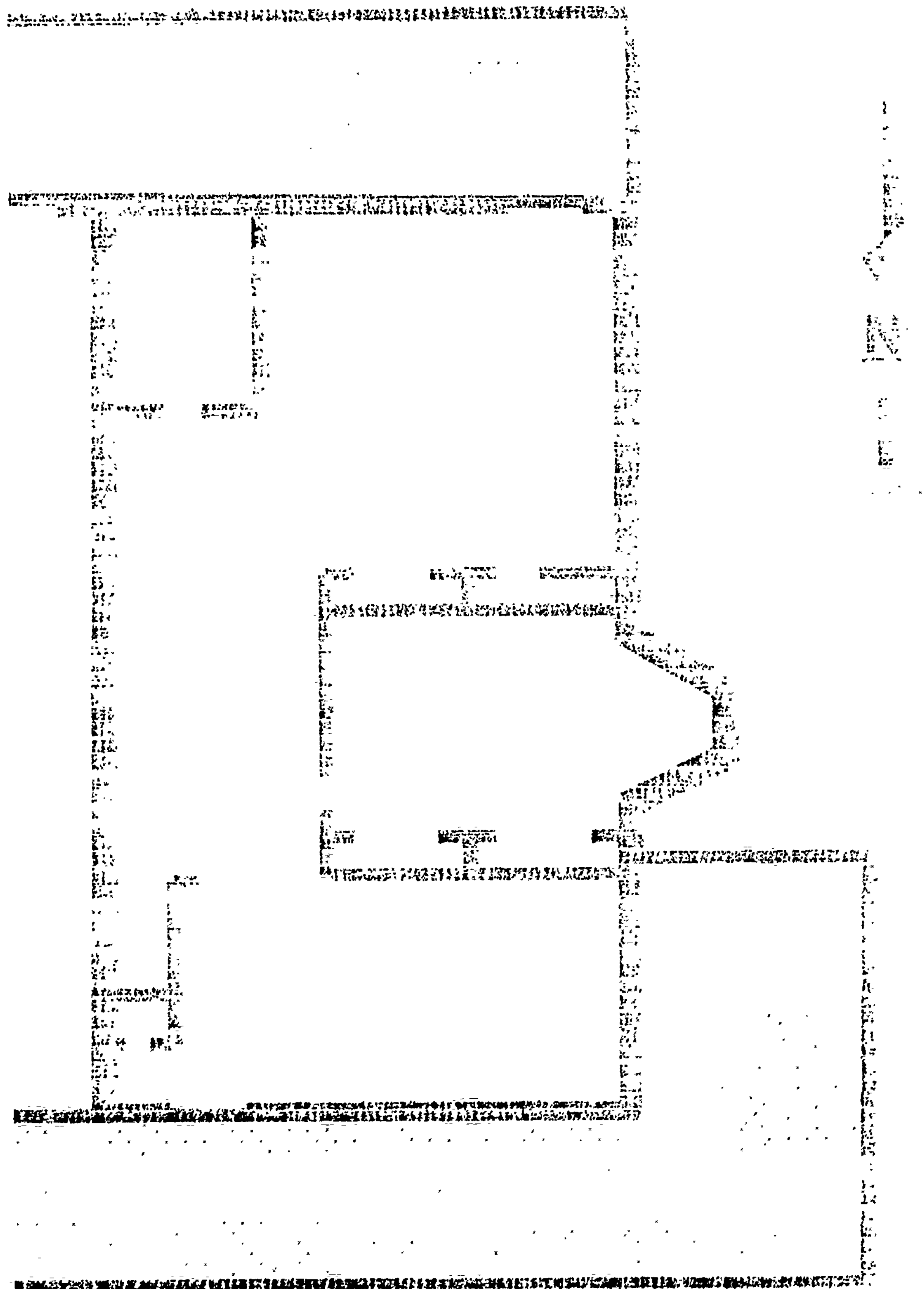
107 East Stratford Avneue

First Floor



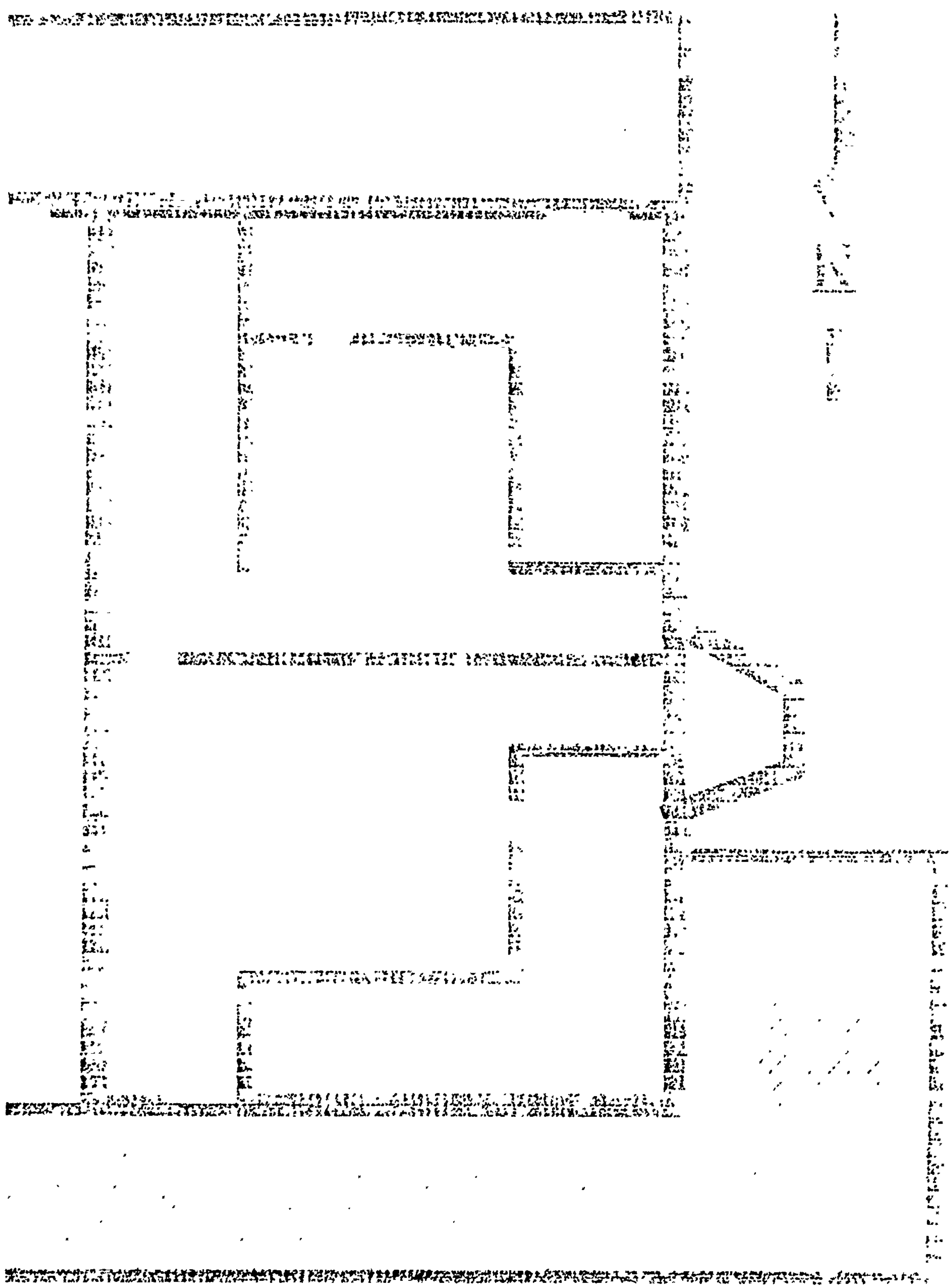
107 East Stratford Avneue

Second Floor



107 East Stratford Avneue

Third Floor



CLOSEOUT REPORT

DISMANTLEMENT OF GARAGES

TABLE OF CONTENTS

LIST OF TABLES

LIST OF GRAPHS

LIST OF MAPS

1.0 INTRODUCTION

During the period of October 3, 1988 to October 8, 1988 the garage at 105 East Stratford was dismantled. On January 12 and 13, 1989 the shed at 107 East Stratford was surveyed, demolished, and disposed of as radioactive waste. Between February 22 and February 25, 1989 the garage at 107 East Stratford was dismantled. From April 18 to 22, 1989 the 110 and 112 Stewart garages were surveyed, dismantled, and disposed of as radioactive waste. To insure these dismantlement activities were performed in a safe manner, not only to the worker but to the public at large, the radiological monitoring programs which had been established for the work on the 105/107 East Stratford residences were continued. All work was performed in accordance with the Safety Health and Emergency Response Plan (SHERP) and the Contractor's Quality Control Plan (CQCP). The following sections present a description and summary of the surveys performed during the operations associated with the dismantlement of the four garages and one shed associated with the project site.

2.0 GENERAL

During this phase of the work, the following types of air samples were collected: high flow rate - occupational, low flow rate - occupational and environmental, lapel (breathing zone) - occupational, and radon progeny (WL) - occupational and environmental. During the periods of dismantlement, surveys for gamma and beta-gamma exposure rates were performed in the work areas.

Prior to beginning the structural dismantlement operations Phase Hazard Analyses were generated, discussed, and signed by each worker. At the beginning of each day of operation, a verbal discussion was held, with all workers on the site attending, to discuss topics relevant to the safety issues of the day.

3.0 AIR SAMPLING PROGRAM (OCCUPATIONAL)

3.1 GENERAL

The data generated from the three types of air samples was compiled to generate a daily Maximum Permissible Concentration-hour (MPC-h) exposure. The data sets are presented in Appendix K at the end of this chapter. Graphic representations are also provided in Appendix K. Air concentration limits and sample analysis methodology are discussed in detail in Section 3 of Chapter 4 of this document. The procedures used for this phase of the Lansdowne Project were the same as those used previously.

3.2 HIGH FLOW RATE AIR PARTICULATE SAMPLES

During this part of the dismantlement project, a total of 18 high flow rate air samples were collected. The largest MPC-h concentration was 0.183 MPC-h per day of Radium-226. The minimum was not measurable above background. The average throughout the period of dismantlement was approximately 0.126 MPC-h per day of Radium-226.

3.3 LOW FLOW RATE AIR PARTICULATE SAMPLES

Twenty-nine low flow rate air samples were collected during this work phase. The highest concentration was 0.016 MPC-h of Radium-226. The minimum was not measurable above background. The average throughout the period of dismantlement was approximately 0.0065 MPC-h per day of Radium-226.

3.4 LAPEL (BREATHING ZONE) AIR SAMPLES

During this period of dismantlement, 7 lapel (breathing zone) air samples were collected. The highest concentration was 0.167 MPC-h of Radium-226. The minimum was not measurable above background. The average throughout the period of dismantlement was about 0.064 MPC-h per day of Radium-226.

4.0 AIR SAMPLING PROGRAM (ENVIRONMENTAL)

4.1 GENERAL

The environmental air sampling data sets are presented in Appendix L at the end of this chapter. Graphic representations are also provided in the appendix. Air concentration limits and sample analysis methodology are discussed in detail in Section 4 of Chapter 4 of this document. The procedures used for this phase of the Lansdowne Project were the same as those used previously.

4.2 LOW FLOW RATE AIR PARTICULATE SAMPLES

Thirty-two air samples were taken at the CAM stations during this work phase. The highest value, 4.00E-14 μCi/ml, was obtained at station #3 during the sampling period beginning September 30, 1988. This value is less than two percent of the applicable limit of 3.0E-12 μCi/ml. The minimum concentration was not measurable above background.

5.0 WORK AREA GAMMA SURVEYS

5.1 GENERAL

Exposure rate measurements and contamination control criteria are discussed in detail in Section 5 of Chapter 4 of this document. Procedures were not changed during this phase of the project. Due to the nature of the work performed during this phase, the criteria applied was predominantly open air dismantlement. The only exception was the 105 East Stratford garage, which was dismantled applying the weather cover criteria.

During this dismantlement period, 20 measurements were made on the interior and exterior of the 105 East Stratford structure; 23 readings were taken on the interior and exterior of the 107 East Stratford structure; 33 survey measurements were performed on the interior and exterior of the 110 Stewart structure; and 12 readings were collected on the interior and exterior of the 112 Stewart structure. Results of the surveys are presented below.

TABLE 5.1
EXPOSURE RATE MEASUREMENTS

LOCATION	DATE	MIN. μR/hr	MAX. μR/hr	# READINGS
105 GARAGE	OCT 4, 1988	27	173	20
107 GARAGE	JAN 24, 1989	13.8	28	23
107 SHED	JAN 3, 1989	14.2	20	25
110 STEWART GARAGE	MAR 30, 1989	*	53	33
112 STEWART GARAGE	APR 13, 1989	14.4	100	5

* no activity detectable above background

6.0 BETA GAMMA SURVEYS

During the course of the structural dismantlement, the criteria established in the CQCP were used to define the rubble removed as either clean or contaminated. Material

was defined as contaminated if it met one or more of the following: survey results greater than two standard deviations above background, the object had a surface which was painted or treated, or the object had inaccessible areas which could not be surveyed.

The following table provides a summary of the ranges, greater than two standard deviations above background, for the general material categories. Ludlum 177 and Ludlum 44-9 or comparable instruments were used to perform the surveys.

TABLE 6.1

BETA-GAMMA ACTIVITY RANGES BY MATERIAL TYPE

Item removed	Range of Beta-Gamma Activity (readings in CPM)
Wood	* to 30000
Concrete	* to 2900
Miscellaneous**	10 to 50000

* Indicates no detectable activity above background
** Miscellaneous includes such items as cloth, glass plastic, etc.

7.0 SURVEYS FOR REMOVABLE ACTIVITY

7.1 GENERAL

Surveys were performed for removable activity by wiping a cloth filter over an area of 100 square centimeters. The survey results were used to direct contamination control efforts and to provide information regarding the extent of contamination within the structures. Direct radiological measurements were utilized to determine fixed contamination levels on building materials, which were used to determine the final radiological deposition.

7.2 SURVEYS

A total of 70 swipe measurements were made during this phase of the project. Fifty-six direct measurements with alpha and beta-gamma radiation detection instruments were made on various building materials. Twenty-nine swipes and direct measurements were collected in the garage at 105 East Stratford. Measurements were collected on the first and second floors of both the 105 and 107 East Stratford

garages. Surveys were also performed in the 110 and 112 Stewart garages. Survey data for each structure is presented in the following tables.

TABLE 7.1

TOTAL AND REMOVABLE CONTAMINATION SURVEY DATA

Location	Date	Min dpm/100cm2	Max.	# of READINGS
105 GARAGE	OCT 3,	*	1471(A)	10S
	1988	*	3200(B)	10S
		500	30000(B)	10D
	OCT 4,	*	132(A)	20S
	1988	*	400(B)	20S
		59	294(A)	18D
		6000	300000(B)	18D
	OCT 6, 1988	10000	29000(A)	11D
	FEB 23, 1989	500	2000	DIRECT SCAN
	FEB 25,	600	2000	DIRECT SCAN
	1989	500	1000	DIRECT SCAN
110 GARAGE	MAR 3,	*	15(A)	20
	1989	*	116(B)	20
	MAR 30,	*	2(A)	20
	1989	*	70(B)	20
112 GARAGE	MAR 30,	*	5(A)	10
	1989	*	56(B)	10
		400	106000	27D

Notes: * indicates no detectable activity above background
(A)=alpha activity, (B)=beta-gamma activity
D=direct reading, S=swipe

8.0 PHASE HAZARD ANALYSIS

Prior to beginning dismantlement operations, a Phase Hazard Analysis was written. A phase hazard analysis is a document which contains a list of the appropriate safety apparel for the job, and general work instructions. This document was verbally discussed with the personnel who were to be involved in the particular phase. Each worker was then given the opportunity to read the document and required to sign it to confirm that they understood the instructions. A summary of the Phase Hazard Analyses used during this work phase is provided as Appendix M of

this document.

9.0 TOOL BOX SAFETY DISCUSSION

At the close of each work week all site personnel participated in a safety discussion. Safety issues of the week were recapped, and a general outline of the next week's activities was presented. This safety meeting was an interactive meeting between management and labor. A summary of the general topics covered at these meetings during this work phase is provided in Appendix M of this document.

APPENDIX 5-A

OCCUPATIONAL AIR SAMPLES

APPENDIX 5-A

OCCUPATIONAL AIR SAMPLES

DISMANTLEMENT OF GARAGES

GENERAL

This appendix contains the data sets for the occupational air sampling program. Shown below is the a key to identify the types of measurements made at the 105 and 107 East Stratford garages.

AIR SAMPLE ID

L D - H V O - 0 0 0 1 - 0 1 - W L

OBJECT DISMANTLED
WL = WALL
CE = CEILING
HI = CHIMNEY
SA = LSA BOX
OT = OTHER

STRUCTURAL LEVEL
01 = FIRST FLOOR
02 = SECOND FLOOR

UNIQUE SEQUENTIAL SAMPLE ID

TYPE OF AIR SAMPLE
HVO = HIGH VOLUME OCCUPATIONAL
APO = AIR PARTICULATE OCCUPATIONAL
LPO = LAPEL OCCUPATIONAL
WLO = WORKING LEVEL OCCUPATIONAL

PROJECT SITE
LD = LANSDOWNE, PA

LOCATION CODE

1 1 5

STRUCTURE WHERE
SAMPLE COLLECTED
5 = 105 E. STRATFORD SIDE
7 = 107 E. STRATFORD SIDE

LEVEL OF STRUCTURE
1 = FIRST FLOOR
2 = SECOND FLOOR

LO[illegible]ENTIFIER
0 = GARAGE
2 = CONTAINMENT

105 EAST STRATFORD GARAGE

Sample ID	Location	Sample in	μCi/ml (alpha)
LD-HVO-0142-01-OT	015	3-Oct-88	3.19E-13
LD-HVO-0144-01-OT	015	3-Oct-88	2.86E-13
LD-HVO-0145-01-OT	015	4-Oct-88	1.80E-12
LD-HVO-0150-01-OT	015	5-Oct-88	2.24E-13
LD-APO-0156-01-OT	015	6-Oct-88	1.52E-12
LD-HVO-0151-01-OT	015	6-Oct-88	4.29E-13
LD-HVO-0152-01-OT	015	6-Oct-88	4.62E-13
LD-HVO-0154-01-OT	015	6-Oct-88	1.09E-12
LD-HVO-0155-01-OT	015	6-Oct-88	2.29E-12
LD-HVO-0157-01-WL	015	7-Oct-88	1.17E-12
LD-HVO-0158-01-WL	015	7-Oct-88	5.48E-11
LD-HVO-0159-01-WL	015	7-Oct-88	2.79E-12
LD-HVO-0160-01-WL	015	8-Oct-88	3.67E-13
LD-HVO-0161-01-WL	015	8-Oct-88	8.29E-13
LD-APO-0339-00-OT	015	4-Nov-88	3.17E-13

AVERAGE PER SUBPHASE: 4.58E-12 μCi/ml

107 EAST STRATFORD GARAGE

Sample ID	Location	Sample in	μCi/ml (alpha)
LD-HVO-0006-01-OT	017	20-Aug-88	4.51E-14
LD-HVO-0007-01-OT	017	20-Aug-88	-2.24E-14
LD-APO-0861-01-OT	017	10-Feb-88	0.00E+00
LD-APO-0862-01-OT	017	10-Feb-88	1.06E-13
LD-LPO-0866-01-OT	017	10-Feb-88	2.84E-12
LD-APO-0993-01-OT	017	23-Feb-88	5.39E-13
LD-APO-0994-01-OT	017	23-Feb-88	3.76E-14
LD-APO-0995-01-OT	017	23-Feb-88	8.78E-14
LD-APO-0996-01-OT	017	23-Feb-88	1.25E-14
LD-LPO-0997-01-OT	017	23-Feb-88	2.09E-12
LD-LPO-0998-01-OT	017	23-Feb-88	2.73E-12
LD-APO-0999-01-OT	017	24-Feb-88	2.77E-13
LD-APO-1001-01-OT	017	24-Feb-88	8.45E-14
LD-APO-1002-01-OT	017	24-Feb-88	6.27E-15
LD-APO-1003-01-OT	017	24-Feb-88	5.48E-14
LD-LPO-1012-01-OT	017	24-Feb-88	1.30E-13
LD-APO-1015-01-OT	017	25-Feb-88	3.21E-14
LD-LPO-1030-01-OT	017	27-Feb-88	3.12E-12
LD-LPO-1031-01-OT	017	27-Feb-88	2.09E-13
LD-LPO-1032-01-OT	017	28-Feb-88	1.56E-12

AVERAGE PER SUBPHASE: 6.97E-13 μCi/ml

GENERAL

Presented in this part of the appendix are the data sets for the occupational air sampling program for the 110 and 112 Stewart garages. A key to identify the types of measurements taken is shown below. The 110 Stewart garage was demolished rather than being dismantled piece by piece. Soil excavation activities were occurring concurrent with the garage dismantlements.

AIR SAMPLE ID

L D - H V O - 0 0 0 1 - 0 1 - CC

GRID BLOCK
BEING EXCAVATED
AC = 99 STRATFORD
BC = 110 STEWART
CC = 112 STEWART
GA = 60 UNION
KA = 115 STRATFORD
A = SITE PROPER

GRID BLOCK
01 = NUMBER

UNIQUE SEQUENTIAL SAMPLE ID

TYPE OF AIR SAMPLE
HVO = HIGH VOLUME OCCUPATIONAL
APO = AIR PARTICULATE OCCUPATIONAL
LPO = LAPEL OCCUPATIONAL

PROJECT SITE
LD = LANSDOWNE, PA

110 STEWART GARAGE

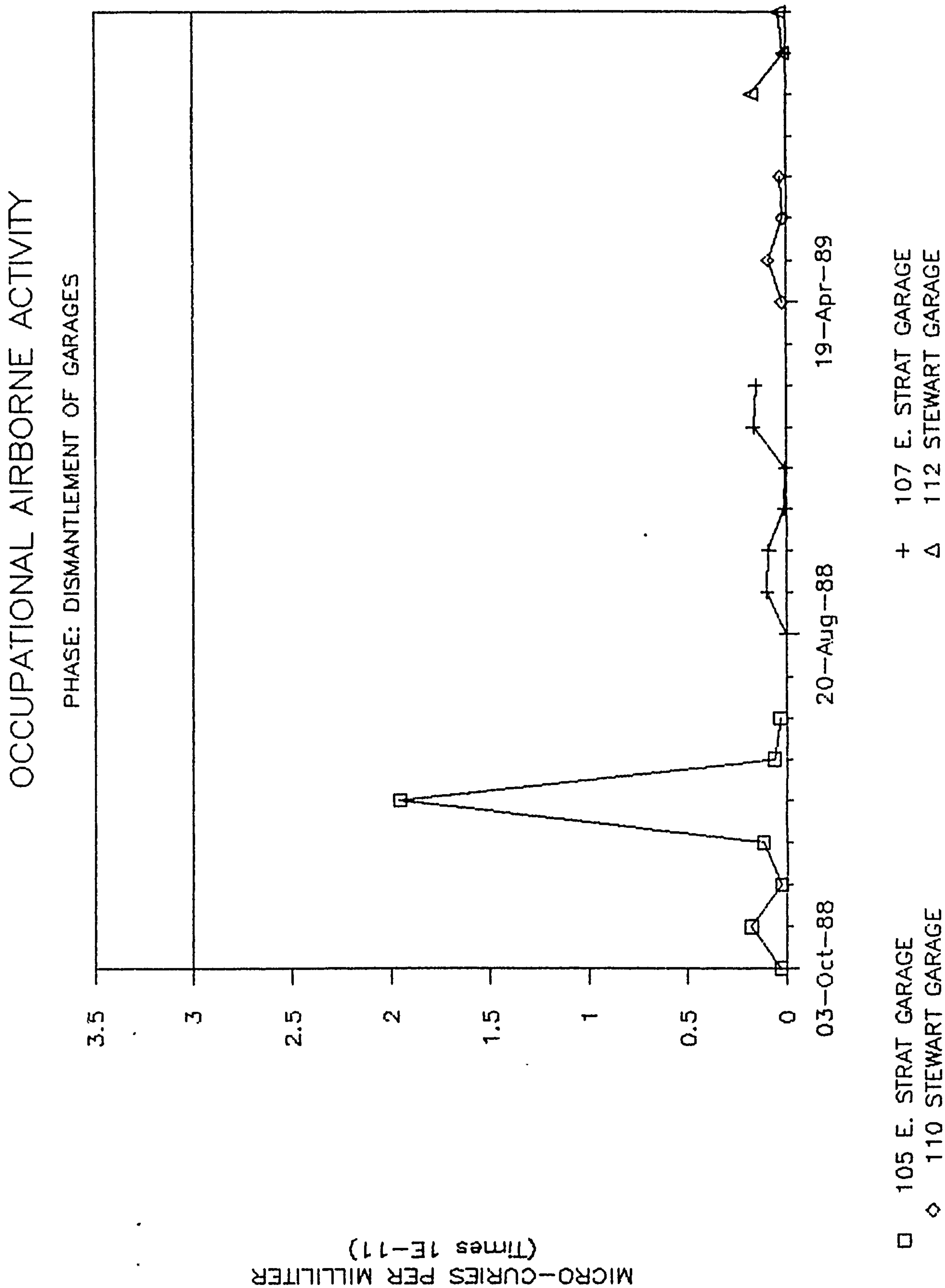
Sample ID	Location	Sample In	µCi/ml (alpha)
LD-APO-1234-04-BB	345	19-Apr-88	1.77E-13
LD-APO-1235-04-BB	345	19-Apr-88	1.77E-13
LD-APO-1238-04-C	345	20-Apr-88	4.67E-13
LD-APO-1239-04-C	345	20-Apr-88	1.24E-13
LD-APO-1244-04-C	345	20-Apr-88	2.18E-13
LD-LPO-1245-03-B	345	20-Apr-88	2.72E-12
LD-APO-1247-05-C	345	22-Apr-88	1.30E-13
LD-APO-1248-05-D	345	22-Apr-88	1.50E-13
LD-APO-1264-04-CC	345	21-Apr-88	1.49E-13
LD-APO-1265-04-CC	345	21-Apr-88	2.32E-13
LD-APO-1266-04-CC	345	21-Apr-88	1.66E-13
LD-APO-1267-04-CC	345	21-Apr-88	8.30E-14
LD-HVO-1268-14-V	347	21-Apr-88	4.51E-13
LD-LPO-1269-05-CC	345	21-Apr-88	6.24E-13

Average per subphase: 4.19E-13 µCi/ml

112 STEWART GARAGE

Sample ID	Location	Sample In	µCi/ml (alpha)
LD-APO-1231-02-BC	345	19-Apr-88	1.28E-13
LD-APO-1233-04-BB	345	19-Apr-88	8.04E-14
LD-LPO-1237-01-OT	345	19-Apr-88	5.02E-12
LD-APO-1241-03-D	345	20-Apr-88	1.09E-13
LD-APO-1242-04-E	345	20-Apr-88	4.67E-14
LD-APO-1243-04-D	345	20-Apr-88	1.71E-13
LD-HVO-1250-04-C	345	22-Apr-88	5.26E-13
LD-HVO-1251-03-D	345	22-Apr-88	4.51E-13
LD-LPO-1252-01-OT	345	22-Apr-88	6.24E-15

Average per subphase: 7.26E-13 µCi/ml



K.1 OCCUPATIONAL AIRBORNE CONCENTRATIONS

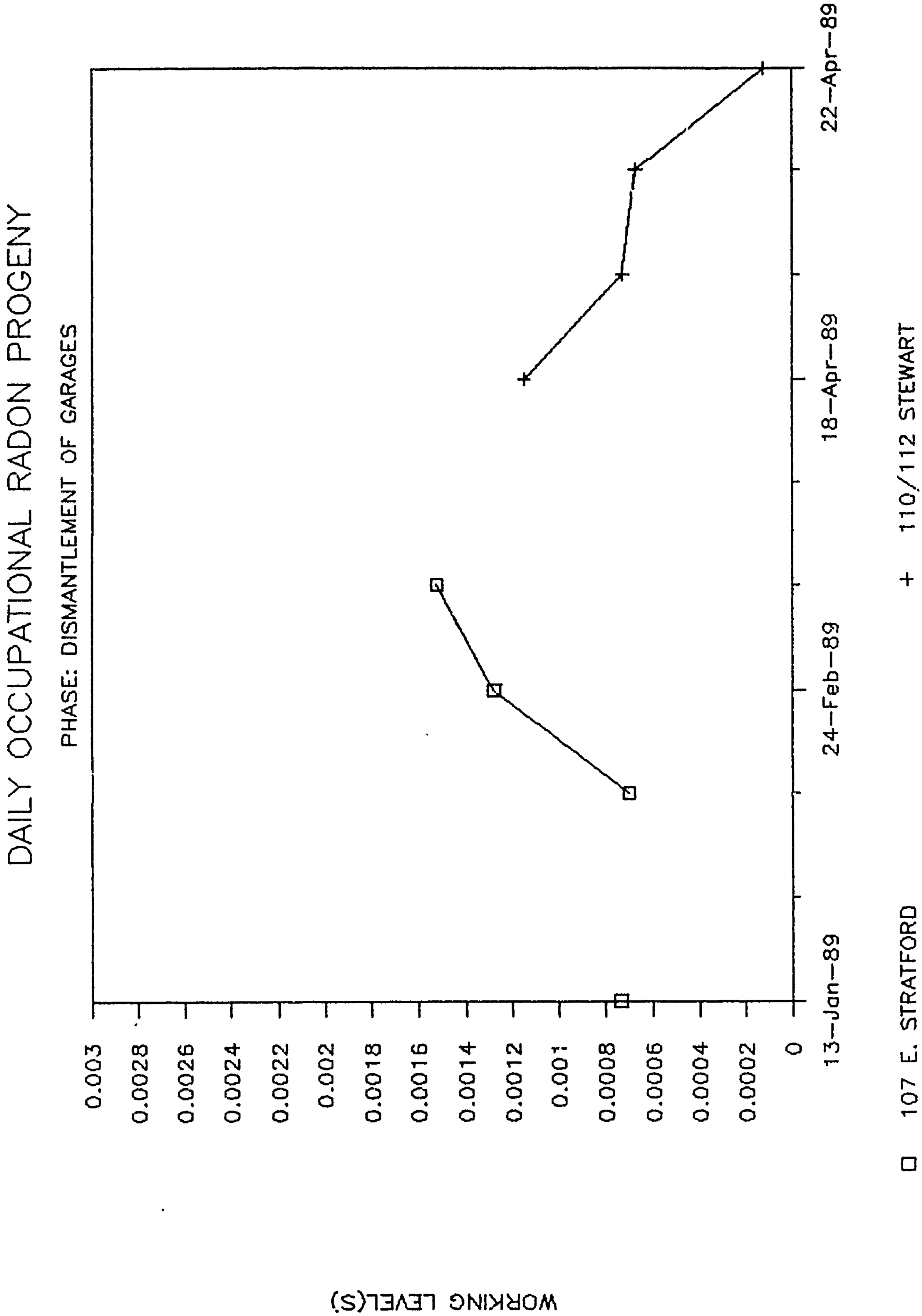
OCCUPATIONAL RADON PROGENY DATA (WORKING LEVELS)

DISMANTLEMENT OF GARAGES

Sample ID	Date	Time	Conc.(WL)
LD-WLO-0174	13-Jan-88	1554	6.49E-04
LD-WLO-0171	13-Jan-88	739	8.27E-04
LD-WLO-0294	23-Feb-88	750	7.00E-04
LD-WLO-0297	24-Feb-88	740	1.28E-03
LD-WLO-0303	25-Feb-88	1500	1.24E-03
LD-WLO-0301	25-Feb-88	800	1.81E-03
LD-WLO-0430	18-Apr-88	1350	7.85E-04
LD-WLO-0428	18-Apr-88	1000	1.51E-03
LD-WLO-0433	19-Apr-88	1036	7.28E-04
LD-WLO-0437	20-Apr-88	818	1.03E-03
LD-WLO-0438	20-Apr-88	1520	6.79E-04
LD-WLO-0439	20-Apr-88	1525	3.02E-04
LD-WLO-0446	22-Apr-88	1511	1.25E-04

OCCUPATIONAL RADON PROGENY DATA (WORKING LEVELS)
DAILY AVERAGES

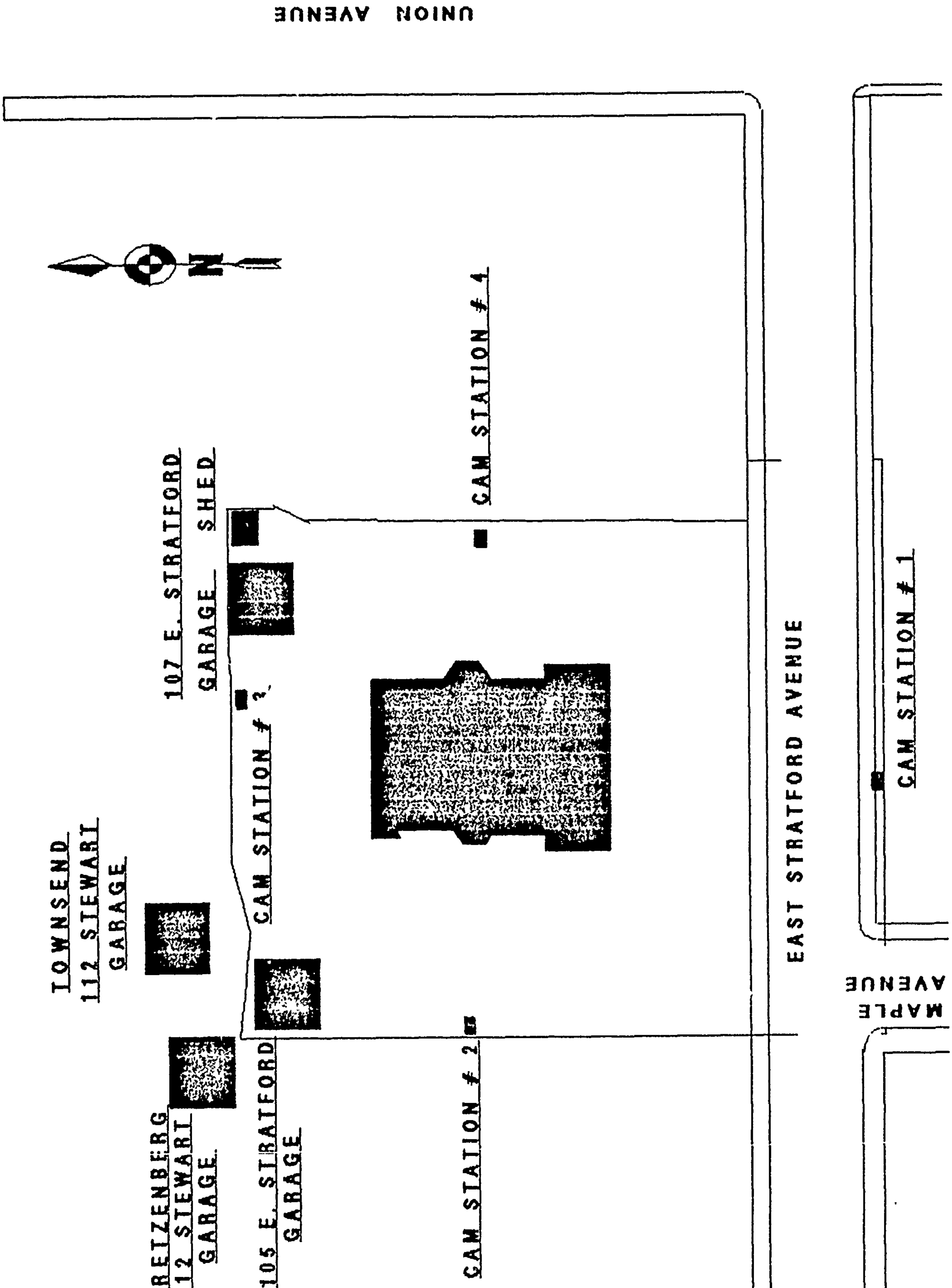
Date	Conc. (WL)
13-Jan-88	7.38E-04
23-Feb-88	7.00E-04
24-Feb-88	1.28E-03
25-Feb-88	1.52E-03
18-Apr-88	1.15E-03
19-Apr-88	7.28E-04
20-Apr-88	6.70E-04
22-Apr-88	1.25E-04



K.2 OCCUPATIONAL WL

APPENDIX 5-B

ENVIRONMENTAL AIR SAMPLES DURING GARAGE DISMANTLEMENT



L.1 GARAGE LOCATIONS

ENVIRONMENTAL AIR SAMPLES

1.0 GENERAL

Appendix L contains the data sets for the environmental air sampling program during this work phase. As the environmental data shows low levels of airborne activity, it was not corrected to show the actual radium activity. Rather, the gross alpha values were treated as the actual radium values. It should be noted that the actual radium concentrations in air would be significantly lower had a correction been applied. Shown below is the a key to identify the types of measurements taken.

AIR SAMPLE ID

L D - A P E - 0 0 0 1

UNIQUE SEQUENTIAL
SAMPLE IDENTIFIER

TYPE OF AIR SAMPLE COLLECTED
APE = AIR PARTICULATE ENVIRONMENTAL
WLE = WORKING LEVEL ENVIRONMENTAL

PROJECT SITE
LD = LANSDOWNE, PA

LOCATION CODE

0 1

AIR SAMPLER STATION ID
1 = CAM STATION # 1
2 = CAM STATION # 2
3 = CAM STATION # 3
4 = CAM STATION # 4

SAMPLER TYPE
0 = ALPHA - 5
1 = AMS - 3

ENVIRONMENTAL AIR SAMPLE DATA

GARAGE DISMANTLEMENT PHASE

Sample ID	Location	Samp. Start	μCi/ml (Alpha)
LD-APE-0044	01	30-Sep-88	6.60E-15
LD-APE-0045	11	30-Sep-88	1.50E-15
LD-APE-0046	02	30-Sep-88	7.80E-15
LD-APE-0047	12	30-Sep-88	5.90E-15
LD-APE-0048	03	30-Sep-88	4.00E-14
LD-APE-0049	13	30-Sep-88	8.70E-15
LD-APE-0050	14	30-Sep-88	1.90E-15
LD-APE-0051	04	30-Sep-88	4.30E-15

Average per sub-phase: 3.40E-14 μCi/ml (105 GARAGE)

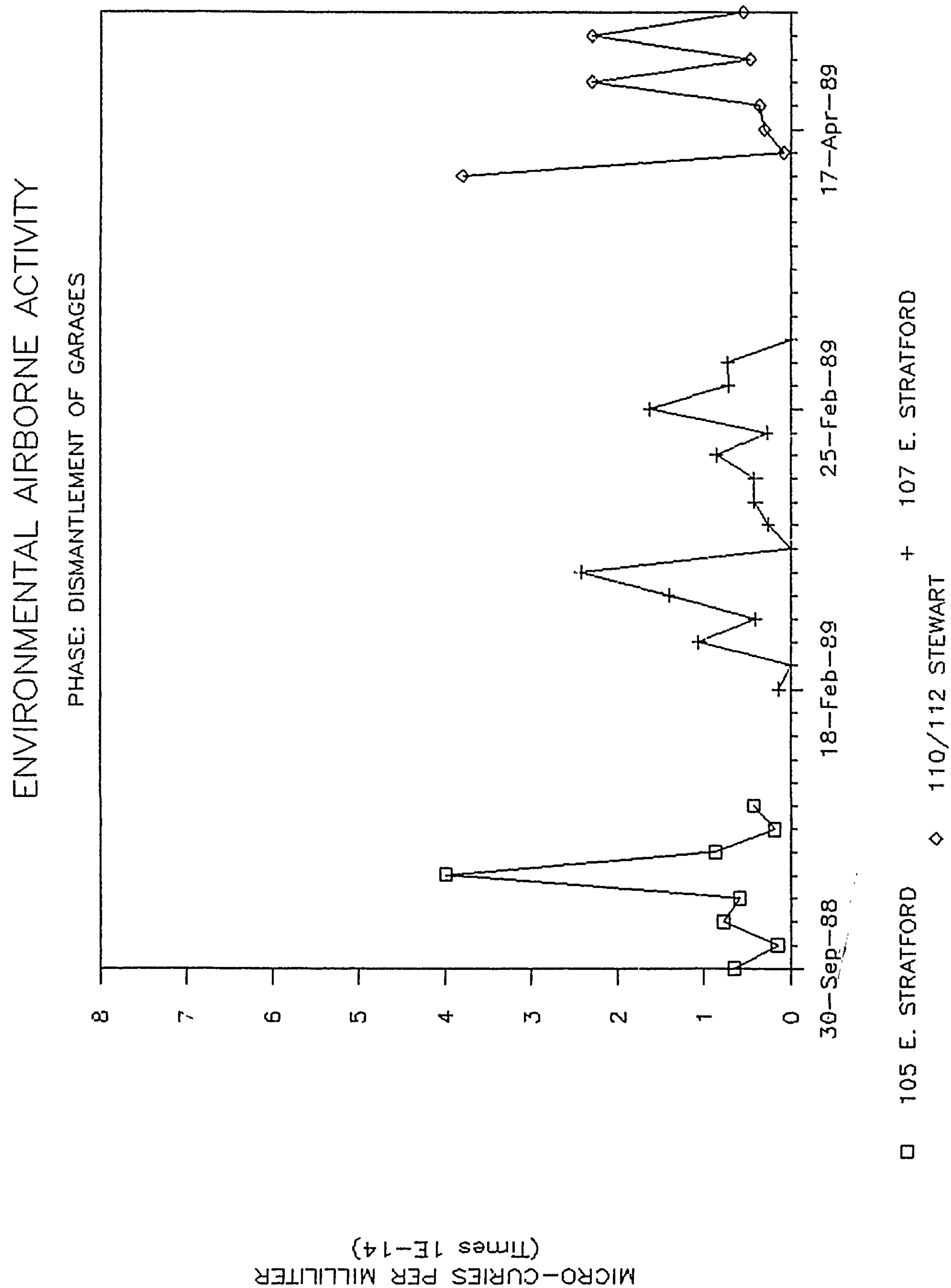
Sample ID	Location	Samp. Start	μCi/ml (Alpha)
LD-APE-0227	01	18-Feb-88	1.41E-15
LD-APE-0228	11	18-Feb-88	0.00E+00
LD-APE-0229	02	18-Feb-88	1.07E-14
LD-APE-0230	12	18-Feb-88	4.19E-15
LD-APE-0231	03	18-Feb-88	1.41E-14
LD-APE-0232	13	18-Feb-88	2.44E-14
LD-APE-0233	04	18-Feb-88	0.00E+00
LD-APE-0234	14	18-Feb-88	2.68E-15
LD-APE-0236	01	25-Feb-88	4.24E-15
LD-APE-0237	11	25-Feb-88	4.24E-15
LD-APE-0238	02	25-Feb-88	8.67E-15
LD-APE-0239	12	25-Feb-88	2.83E-15
LD-APE-0240	03	25-Feb-88	1.64E-14
LD-APE-0241	13	25-Feb-88	7.30E-15
LD-APE-0242	04	25-Feb-88	7.34E-15
LD-APE-0243	14	25-Feb-88	0.00E+00

Average per sub-phase: 3.240E-15 μCi/ml (107 GARAGE)

Sample ID	Location	Samp. Start	μCi/ml (Alpha)
LD-APE-0293	01	17-Apr-88	3.80E-14
LD-APE-0295	02	17-Apr-88	8.00E-16
LD-APE-0296	11	17-Apr-88	3.10E-15
LD-APE-0297	12	17-Apr-88	3.60E-15
LD-APE-0298	03	17-Apr-88	2.30E-14
LD-APE-0299	13	17-Apr-88	4.70E-15
LD-APE-0300	04	17-Apr-88	2.30E-14
LD-APE-0301	14	17-Apr-88	5.50E-15

Average per sub-phase: 1.27E-14 μCi/ml
(110/112 Stewart Ave. Garages)

Note: Alpha activity of 0 indicates result less than MDA



L.1 ENVIRONMENTAL AIRBORNE CONCENTRATIONS

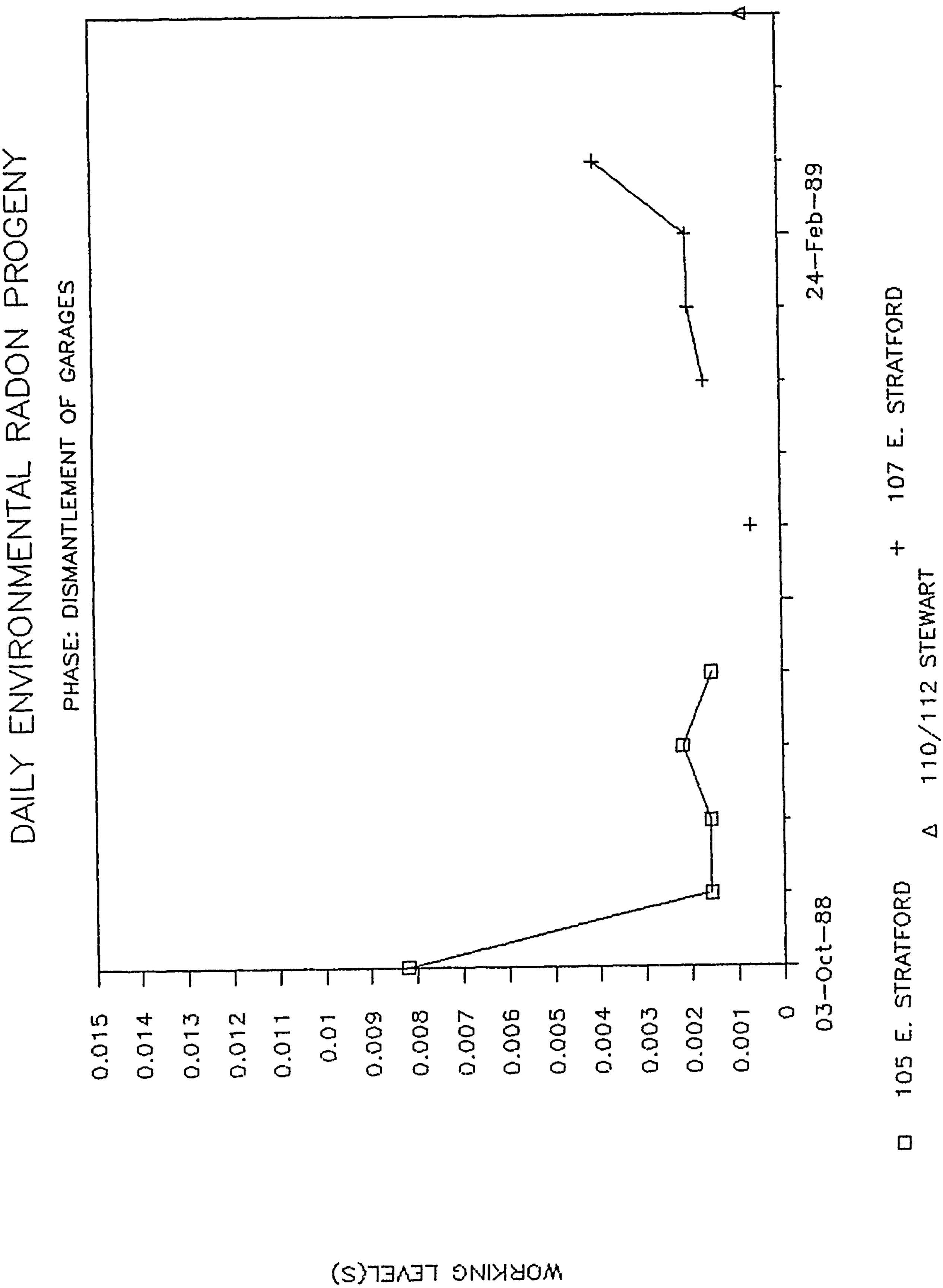
ENVIRONMENTAL RADON PROGENY DATA (WORKING LEVELS)

DISMANTLEMENT OF GARAGES

Sample ID	Date	Time	Conc. (WL)
LD-WLE-020	3-Oct-88	1542	4.92E-04
LD-WLE-017	3-Oct-88	920	2.14E-02
LD-WLE-019	3-Oct-88	1540	9.36E-03
LD-WLE-018	3-Oct-88	925	1.58E-03
LD-WLE-021	4-Oct-88	933	1.59E-03
LD-WLE-023	5-Oct-88	1110	1.59E-03
LD-WLE-026	7-Oct-88	1100	9.47E-04
LD-WLE-027	7-Oct-88	1500	3.41E-03
LD-WLE-028	8-Oct-88	905	1.54E-03
LD-WLE-0173	13-Jan-88	1416	2.24E-04
LD-WLE-0172	13-Jan-88	802	1.08E-03
LD-WLE-0292	22-Feb-88	1100	2.37E-03
LD-WLE-0291	22-Feb-88	940	9.48E-04
LD-WLE-0295	23-Feb-88	1505	1.98E-03
LD-WLE-0300	24-Feb-88	1510	1.19E-03
LD-WLE-0298	24-Feb-88	800	2.84E-03
LD-WLE-0302	25-Feb-88	943	1.24E-03
LD-WLE-0304	25-Feb-88	1541	6.80E-03
LD-WLE-0443	22-Apr-88	1420	2.34E-04
LD-WLE-0441	22-Apr-88	855	7.48E-04
LD-WLE-0444	22-Apr-88	715	1.00E-03
LD-WLE-0447	22-Apr-88	1515	1.12E-03
LD-WLE-0448	24-Apr-88	710	1.69E-03
LD-WLE-0452	25-Apr-88	815	2.12E-03
LD-WLE-0454	25-Apr-88	1505	4.72E-04
LD-WLE-0455	26-Apr-88	720	5.92E-03
LD-WLE-0460	27-Apr-88	710	2.50E-03
LD-WLE-0461	27-Apr-88	1515	1.20E-03

ENVIRONMENTAL RADON PROGENY DATA (WORKING LEVELS)
DAILY AVERAGES

Date	Conc. (WL)
3-Oct-88	8.21E-03
4-Oct-88	1.59E-03
5-Oct-88	1.59E-03
7-Oct-88	2.18E-03
8-Oct-88	1.54E-03
13-Jan-88	6.52E-04
22-Feb-88	1.66E-03
23-Feb-88	1.98E-03
24-Feb-88	2.01E-03
25-Feb-88	4.02E-03
22-Apr-88	7.76E-04



L.2 ENVIRONMENTAL WL

APPENDIX 5-C

PHASE HAZARD ANALYSIS SUMMARY FOR DISMANTLEMENT OF GARAGES

PHASE HAZARD ANALYSIS SUMMARY FOR DISMANTLEMENT OF GARAGES

(105/107 E. Stratford, 110/112 Stewart)

August 20, 1988, Project Phase: First Entry and Inspection of the 107 East Stratford Garage Interior, Summary: Evaluation of decontamination requirements to facilitate use of the garage as a project storage facility.

September 30, 1988, Project Phase: Initial Entry and Interior Dismantlement of 105 East Stratford Garage, Summary: Identification of radiological and non-radiological hazards and removal of all loose and non-structural items from its interior.

October 5, 1988, Project Phase: Exterior Dismantlement of 105 East Stratford Garage, Summary: Dismantlement of the garage to it's concrete slab foundation. Areas of the concrete slab having contamination were scabbled using HEPA vacuums and ventilation.

January 9, 1989, Project Phase: Dismantlement of 107 East Stratford Garage, Summary: Removal of all loose and non-structural items from the garage interior followed by structural dismantlement and removal of the concrete slab foundation.

April 17, 1989, Project Phase: Dismantlement of 110/112 East Stewart Avenue Garages Summary: Dismantlement activities were preceded by removal of all personal property from both garage interiors and the items surveyed for radiological activity. The items were placed into temporary storage pending construction of two new garages. The 112 East Stewart garage was manually dismantled in accordance with site criteria for radiological contaminated structures. The 110 East Stewart garage was dismantled by demolition based upon radiological survey data which demonstrated that it was free of contamination but had a high potential for structural damage due to pending extensive soil excavation immediately adjacent to and under it's foundation.

SUMMARY OF TOOL BOX SAFETY DISCUSSIONS

FOR DISMANTLEMENT OF GARAGES

Topics Presented

1. Respiratory Protection Using Negative Pressure Facepieces.
2. Safe Work Practices When Wearing Respiratory Protection Devices.
3. Accidents Requiring Emergency Medical Assistance.
4. First Aid Treatment
5. Worker Safe Work Practices
6. Laundry Procedures.
7. Smoking within Crew Trailer.

LANSDOWNE

RADIOACTIVE RESIDENCE COMPLEX
DISMANTLEMENT/REMOVAL PROJECT

RADIOLOGICAL CLOSEOUT REPORT

CHEM-NUCLEAR SYSTEMS, INC.
220 STONERIDGE DRIVE
COLUMBIA, SOUTH CAROLINA

CHAPTER 6
PHASE: SOIL REMEDIATION

CHAPTER 6

CLOSEOUT REPORT - SOIL REMEDIATION

TABLE OF CONTENTS

Section Page No.

LIST OF TABLES

LIST OF FIGURES

TABLE OF CONTENTS

LIST OF FIGURES (CONT.)

LIST OF MAPS

1.0 INTRODUCTION

During several work phases between November 21, 1988 and May 8, 1989 the contaminated soil associated 105 / 107 East Stratford, the associated sewer lateral, and contiguous properties was excavated. To insure the excavations were performed in a safe manner not only to the worker but to the public at large, radiological monitoring programs were established. This was accomplished by performing all work operations in accordance with the plans established prior to the beginning of the project. The following sections of this document present descriptions and summaries of the surveys performed to verify compliance with plans covering operations associated with the excavation of contaminated soil.

2.0 GENERAL

In accordance with the Safety Health and Emergency Response Plan (SHERP) and the Contractor's Quality Control Plan (CQCP) the following types of air samples were collected: high flow rate - occupational, low flow rate - occupational and environmental, lapel (breathing zone) - occupational, and radon progeny (Working Level) - occupational and environmental. On a routine basis surveys for gamma and beta-gamma exposure rates were performed in the work area.

Prior to beginning each new major task which was an integral part of soil excavation operations, a Phase Hazard Analysis was generated, explained, and signed by each worker. Along with this, weekly "Tool Box Safety Discussions" were held. At the beginning of each day of operation, a verbal discussion was held, with all workers on the site attending, to talk about topics relevant to the safety issues of the day.

3.0 AIR SAMPLING PROGRAM (OCCUPATIONAL)

3.1 GENERAL

The data generated from the three types of air samples was compiled to generate a daily Maximum Permissible Concentration-hour (MPC-h) exposure. The occupational air sampling data sets are presented in Appendix N of this document. Graphs are also provided in the appendix.

Air concentration limits and sample analysis methodology are discussed in detail in Section 3 of Chapter 4 of this document. The procedures used during soil remediation activities were the same as those discussed previously.

3.2 HIGH FLOW RATE SAMPLES

During the periods of soil excavation, 182 high flow rate air samples were collected. The largest MPC-h concentration was 0.0476 MPC-h per day of Radium-226. The minimum was not measurable above background. The average throughout the periods of soil excavation was approximately 0.008 MPC-h of Radium-226.

3.3 AIR PARTICULATE SAMPLES

During the periods of soil excavation, 257 low flow rate air samples were collected. The highest MPC-h concentration was 0.087 MPC-h of Radium-226. The minimum was not measurable above background. The average throughout the period of dismantlement was about 0.001 MPC-h of Radium-226.

3.4 LAPEL (BREATHING ZONE) AIR SAMPLING

During the period of dismantlement, 89 lapel (breathing zone) air samples were collected. The highest MPC-h concentration was 0.178 MPC-h of Radium-226. The minimum was not measurable above background.

3.4 RADON PROGENY MEASUREMENTS (WORKING LEVELS)

During the period of soil excavation, 197 working level measurements were made. The highest MPC-h concentration was 0.28 MPC-h of Radon progeny. The minimum was not measurable above background. The average throughout the period of dismantlement was about 0.006 MPC-h of Radon progeny.

4.0 AIR SAMPLING PROGRAM (ENVIRONMENTAL)

4.1 GENERAL

The environmental air monitoring data sets are presented in Appendix O of this document. Graphs are also provided for easier viewing of the data, and are included as Figures O.1 through O.4 in the Appendix.

Air concentration limits and sample analysis methodology are discussed in detail in Section 4 of Chapter 4 of this document. The procedures used for this phase of the Lansdowne Project were the same as those used previously.

4.2 AIR PARTICULATE SAMPLES

During the periods of soil excavation a total of 273 environmental air particulate samples were collected. The total number of samples collected from each station was as follows: Station #1 (south) - 69, Station #2 (west) - 69, Station #3 (north) - 66, and Station #4 (east) - 69. The air sample results are shown in Appendix O at the end of

this chapter.

4.3 RADON PROGENY MEASUREMENTS (WORKING LEVELS)

During the periods of soil excavation, 186 working level measurements were collected. The highest MPC-h concentration was 0.219 MPC-h of Radon progeny. The minimum was not measurable above background. The average throughout the periods of soil excavation was approximately 0.042 MPC-h of Radon progeny.

5.0 GAMMA SURVEYS

5.1 GENERAL

Prior to the performance of any soil excavations the entire site was gridded. The grid size was ten feet by ten feet. An origin point was established at the northwest corner of the site fence. This origin point was located two feet south of the northwest property corner. To uniquely identify each grid block, a typical civil surveying identifier was assigned to each grid point. For example, 0+10, 10L would identify a grid point ten feet south and ten feet east of the origin point.

To avoid the cumbersome use of multiple coordinates to identify each corner of a grid block, a single identifier was assigned based on the coordinates for the center point of the grid. The result was that a grid block which would have been described by the coordinates 0+00, 00R; 0+00, 10L; 0+10, 00R; 0+10, 10L became 0+05, 05L. At a later point in time, at the request of the Army Corps of Engineers, a secondary alpha-numeric grid identifier system was employed. This system identified each grid block with a sequential letter from the alphabet, starting with A at the origin point and moving through the alphabet for blocks to the south of the origin. A sequential number was also assigned, which was incremented for grids to the east of the origin. The result was that a grid which was originally identified as 0+00, 00R; 0+00, 10L; 0+10, 00R; 0+10, 10L, then simplified to 0+05, 05L, would become known as grid block A-1. A map of the site showing the grid identification system is included in Appendix S as Map S.1.

Prior to soil excavation activities, a gamma survey was done in each of the grid blocks. A gamma survey was also performed following remediation of the grid block. The data set summaries are provided in Appendix P of this document. Both the pre and post excavation gamma surveys were performed with gamma scintillation detectors. The instruments used on the Lansdowne site were the Eberline

ESP-1 with an Eberline SPA-3, and the Ludlum-2220 with a Ludlum 43-10.

During the soil excavation phase the scintillation detectors were used to provide an initial estimate of the level of contamination present in the soil. Presented in the following section is a brief description of how the contamination levels in soil were estimated.

5.2 COLLIMATED PROBE GAMMA MEASUREMENTS

"Delta gamma" measurements were performed utilizing a gamma scintillometer and a cylindrical lead shield which collimated the detector. This type of measurement was particularly useful in areas with high background or "shine" from nearby areas of contamination. This instrument assembly provides a "field of view" restricted to a cylinder of approximately eight inches diameter by six inches thick. Based on a comparison of instrument response to soil analysis results, it is possible to generate an **approximation** of the pico-curie per gram concentration in soil versus observed count rate, for a soil column of the same size and thickness as the instrument's field of view.

5.3 UNCOLLIMATED PROBE MEASUREMENTS

The "open probe" measurements were performed utilizing a gamma scintillation detectors without shielding. These measurements were useful in areas without excessive background interference. The field of view for an uncollimated probe can be described essentially as an ellipsoid with foci at either end of the sodium iodide crystal. The linear distance, along the long axis, between the surface of the ellipsoidal field of view and the nearest foci is approximately 1.5 feet. The field of view contracts as the detector is pressed closer to a surface or object. Based on this description of the scintillation detector and soil analysis results, it is possible to develop a loose relationship between pico-curie per gram concentration in soil and observed count rate, which can then be used to guide soil excavation.

Uncollimated probes were also used to measure exposure rates. This was accomplished by developing a regression analysis of micro-roentgens per hour measured with a Reuter Stokes RS-111 Pressurized Ionization Chamber (PIC) versus the count rate in one tenth of a minute from a gamma scintillation detector. Both types of measurement were made in the same location and about the same time, to minimize variability of the geometry and the gamma field.

6.0 SOIL ANALYSIS

6.1 GENERAL

Throughout the course of the soil remediation phase soil analysis for Radium-226 was performed. The soil analysis results were used to determine whether the site cleanup criteria, as defined in Section 9.0 of the Safety, Health and Emergency Response Plan, had been reached. The criteria was 5.0 pico-curies per gram in soil above the established background for the following radionuclides: Radium-226, Actinium-227, Thorium-230, and Protactinium-231. A soil sample consisted of an aliquot of soil which was defined as representative of the area in question. The sample consisted of approximately 500 to 700 grams of soil. The soil was placed into an aluminum can, sealed, then counted for 500 seconds on the opposed crystal multi-channel analyzer system to quantify the level of Radium-226 in the soil based on analysis of the Bi-214 daughter.

6.2 TYPES OF SAMPLES COLLECTED

Soil samples were collected for several purposes, including excavation control, verification, cross-correlation, and backfill. Although the use of the samples varied, each sample was collected in the manner described in Section 6.1.

Excavation control samples were collected to determine if additional excavation was needed.

Verification samples were collected to confirm and document that an area had been adequately remediated to the established criteria for soil. All verification samples were collected in duplicate to confirm the contaminant level remaining in the soil.

Cross-correlation samples were collected to support comparisons of activity concentration versus exposure rate measurements made with gamma scintillation detectors, as discussed in section 5.2 and 5.3 of this document.

Backfill samples were collected to confirm that the fill material used on the site was below the site criteria for radium-226 contaminants in soil.

6.3 RADIUM ANALYSIS

Analysis of the soil concentration within an area of concern was accomplished by selectively sampling the area and then analyzing the sample. The instrument which Chem-Nuclear Systems, Incorporated employed to quantify the radium concentration in soil was the Opposed Crystal System (OCS).

The OCS is a multi-channel analyzer used in conjunction with two three inch diameter sodium iodide crystals installed in a lead shield. The sample was placed in a standardized aluminum can to maintain a reproducible geometry. The can fits between the two crystals in the center of the shield. The analysis is based on detection of the Bi-214 daughter of Ra-226, which has been allowed to come to equilibrium by sealing the sample container and then counting after an ingrowth period of at least twenty days. Appendix Q provides a summary of the excavation control and verification samples collected for the Lansdowne project.

6.4 OTHER ANALYSES

The OCS worked well for the analysis of Radium-226, but was not capable of analyzing Actinium-227, Thorium-230, or Protactinium-231. Such analyses were performed by Chem-Nuclear Systems, Incorporated's sub-contractor, Barringer Laboratory Services. More than 10% of the verification samples collected were sent to Barringer Laboratory Services for isotopic analysis. These samples were also analyzed for radium-226 as a quality control check of the OCS.

7.0 BACKGROUND SOIL ANALYSIS

Prior to soil remediation activities, Chem-Nuclear collected a series of soil samples to quantify the concentration levels of the four radionuclides of concern in uncontaminated (background) soil. The results of this survey are presented in the following table.

Table 7.1
Chem-Nuclear Systems, Inc.
Background Soil Concentration Summary

Nuclide	Maximum (pCi/g)	Minimum (pCi/g)	Mean (pCi/g)
Radium-226	1.6 +/- 0.6	0.8 +/-0.5	1.2 +/- 0.6
Actinium-227	0.7 +/- 0.4	0.3 +/-0.3	0.5 +/- 0.3
Thorium-230	1.6 +/- 0.6	0.4 +/-0.3	1.0 +/- 0.4
Protactinium-231	0.2 +/- 1.2	0.0 +/-1.2	0.1 +/- 1.2

8.0 BETA GAMMA SURVEYS

During the course of soil remediation various items were demolished, including concrete sidewalks, foundation slabs, and

asphalt driveways. The criteria established in the Contractor's Quality Control Plan were used to define the rubble as either clean or contaminated. Material was defined as contaminated if it met one or more of the following: survey results greater than two standard deviations above background, the object had a surface which was painted or treated, or the object had inaccessible areas which could not be surveyed.

Due to the number of objects involved, it is not practical to reproduce a complete list of all the items surveyed. Therefore, the following table provides a summary of the ranges, greater than two standard deviations above background, for the general material categories. Ludlum 177 and Ludlum 44-9 or comparable instruments were used to perform the surveys. It should be noted that, owing to the restrictive criteria applied, only a few items were found to be uncontaminated.

Table 8.1
Rubble Activity Ranges
Greater Than 2 Sigma Above Background

Item removed	Range of Beta-Gamma Activity (readings in CPM)
Stone	100 to 5000
Concrete	100 to 1000
Asphalt	10 to 10000

9.0 PHASE HAZARD ANALYSIS

Prior to beginning each a new task in a job phase, a Phase Hazard Analysis was written, reviewed, and approved. A Phase Hazard Analysis covers not only the appropriate safety apparel, but also a general work instruction. This document was verbally discussed with the personnel who were to be involved in the particular phase. Upon completion of the verbal discussion each worker was given the opportunity to read the document, and then signed it to indicate their understanding of its contents. A summary of the Phase Hazard Analyses for the soil remediation phase is provided in Appendix R of this document.

10.0 TOOL BOX SAFETY DISCUSSION

At the close of each work week all site personnel participated in a safety discussion. It was at this point that safety issues of

the week were recapped, and in a general manner the next week's activities were outlined. This safety meeting was a interactive discussion between management and labor. A summary of the Tool Box Safety Discussion topics for the soil remediation phase is provided in Appendix R of this document.

APPENDIX 6-A

OCCUPATIONAL AIR SAMPLES

OCCUPATIONAL AIR SAMPLES

1.0 GENERAL

The data sets for the occupational air sampling program are presented in this appendix. A key to identify the types of measurements taken is shown below.

AIR SAMPLE ID

L D - H V O - 0 0 0 1 - 0 1 - CC

GRID BLOCK
EXCAVATED
AC = 99 STRATFORD
BC = 110 STEWART
CC = 112 STEWART
GA = 60 UNION
KA = 115 STRATFORD
A = SITE PROPER
(see site map in
Appendix S for
other locations)

GRID BLOCK NUMBER
01 = GRID NUMBER

UNIQUE SEQUENTIAL SAMPLE ID

TYPE OF OCCUPATIONAL AIR SAMPLE
HVO = HIGH FLOW RATE
APO = LOW FLOW RATE
LPO = LAPEL (BREATHING ZONE)

PROJECT SITE
LD = LANSDOWNE, PA

LOCATION CODE

1 4 5

SIL [illegible] PROPERTY WHERE
SAMPLE COLLECTED
5 = 105 E. STRATFORD SIDE
7 = 107 E. STRATFORD SIDE

LEVEL WHERE SAMPLE WAS COLLECTED
4 = SOIL LEVEL

WORK PHASE
3 = SOIL REMEDIATION

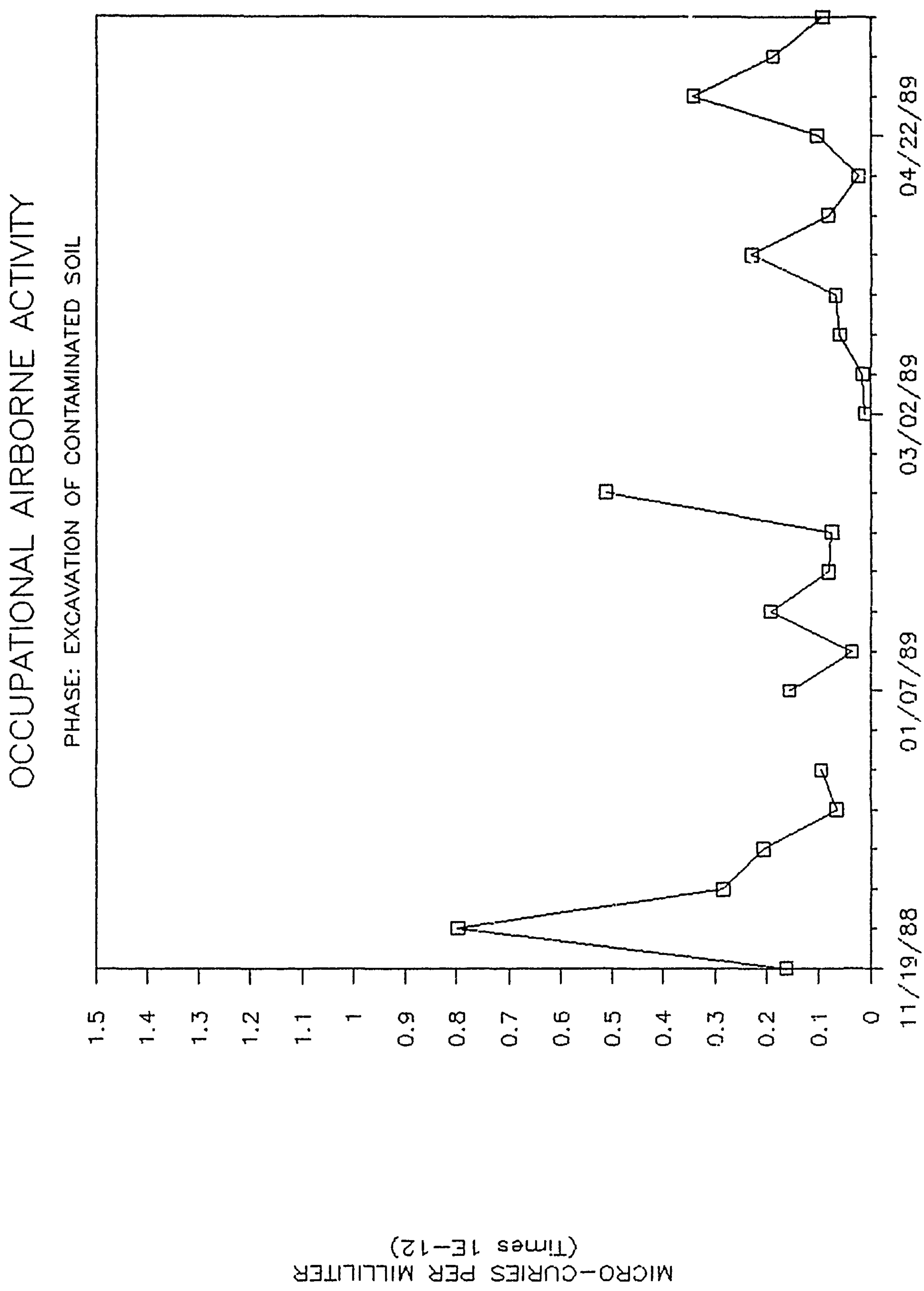


FIGURE N.1 OCCUPATIONAL AIRBORNE ACTIVITY

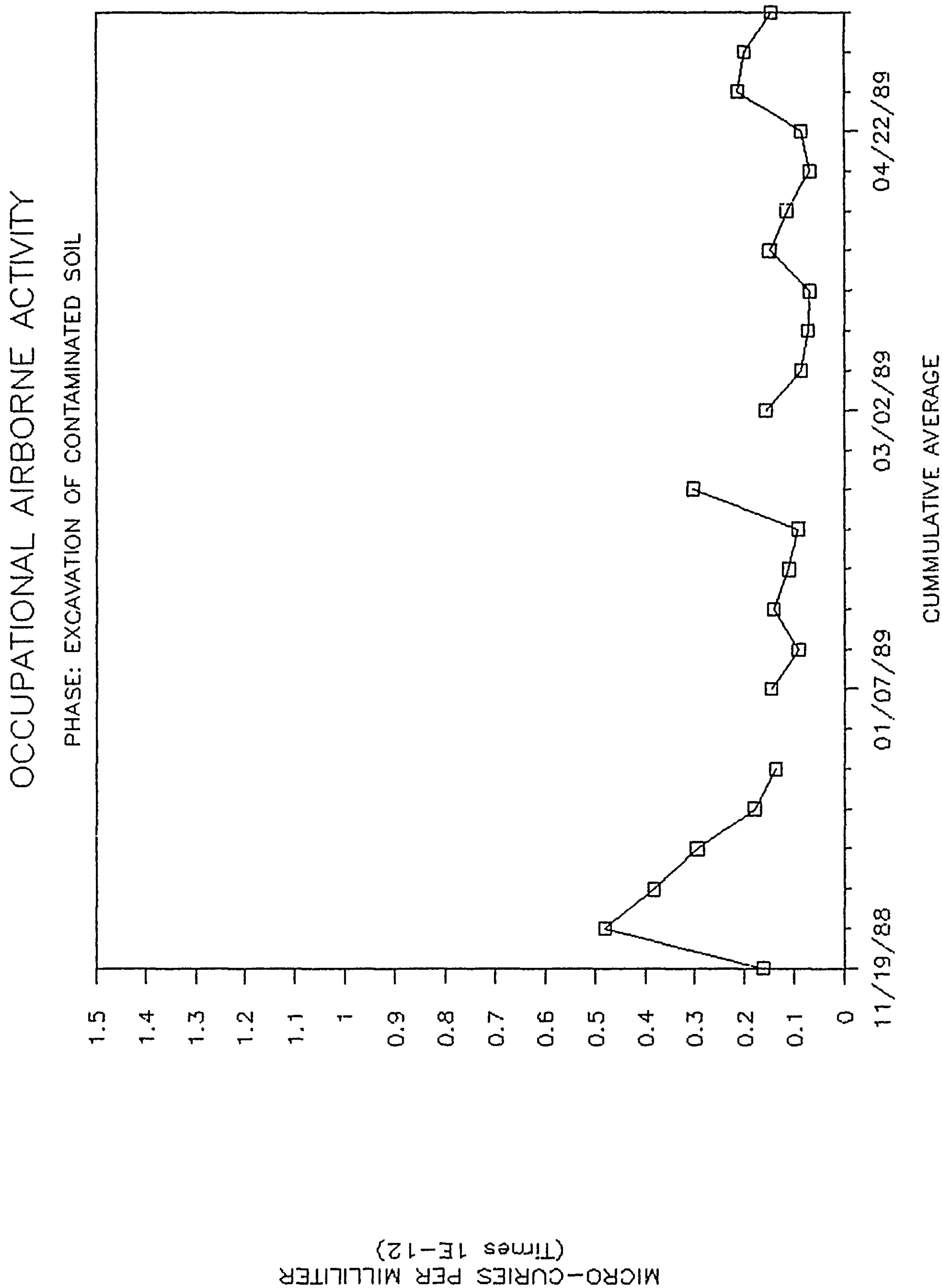


FIGURE N.2 CUMULATIVE AVERAGE

OCCUPATIONAL AIR SAMPLING DATA

Sample ID	Location	Samp Date	Alpha Act. (μCi/ml)
LD-HVO-0438-07-R	345	19-Nov-88	1.76E-13
LD-HVO-0439-07-R	345	19-Nov-88	8.80E-14
LD-HVO-0440-07-R	345	19-Nov-88	2.27E-13
LD-APO-0450-02-B	345	21-Nov-88	2.62E-12
LD-HVO-0441-01-A	345	21-Nov-88	4.40E-13
LD-HVO-0442-01-A	345	21-Nov-88	2.75E-13
LD-HVO-0443-01-A	345	21-Nov-88	3.01E-13
LD-HVO-0444-01-A	345	21-Nov-88	3.23E-13
LD-HVO-0445-01-A	345	21-Nov-88	2.33E-13
LD-HVO-0446-01-A	345	21-Nov-88	3.50E-13
LD-HVO-0447-01-A	345	21-Nov-88	3.63E-13
LD-HVO-0448-01-A	345	21-Nov-88	4.93E-13
LD-LPO-0449-02-B	345	21-Nov-88	2.29E-12
LD-HVO-0451-02-B	345	22-Nov-88	3.76E-13
LD-HVO-0452-02-B	345	22-Nov-88	2.46E-13
LD-HVO-0453-02-B	345	22-Nov-88	4.03E-13
LD-HVO-0454-02-B	345	22-Nov-88	1.43E-12
LD-HVO-0455-02-B	345	22-Nov-88	4.66E-13
LD-HVO-0456-02-B	345	22-Nov-88	2.08E-13
LD-LPO-0457-02-B	345	22-Nov-88	5.35E-12
LD-LPO-0458-02-B	345	22-Nov-88	4.25E-12
LD-HVO-0459-02-B	345	23-Nov-88	2.08E-13
LD-HVO-0460-02-B	345	23-Nov-88	2.33E-13
LD-HVO-0461-02-B	345	23-Nov-88	1.46E-13
LD-HVO-0462-02-B	345	23-Nov-88	4.14E-13
LD-HVO-0463-02-B	345	23-Nov-88	2.68E-14
LD-HVO-0464-02-B	345	23-Nov-88	2.73E-13
LD-HVO-0465-02-B	345	23-Nov-88	3.23E-13
LD-HVO-0466-02-B	345	23-Nov-88	1.69E-13
LD-HVO-0466-02-B	345	23-Nov-88	2.84E-13
LD-LPO-0468-02-B	345	23-Nov-88	2.40E-13
LD-LPO-0469-02-B	345	23-Nov-88	4.16E-13
LD-HVO-0470-02-D	345	29-Nov-88	7.57E-13
LD-HVO-0471-02-D	345	29-Nov-88	6.16E-13
LD-HVO-0472-02-D	345	29-Nov-88	6.42E-13
LD-HVO-0474-02-D	345	29-Nov-88	3.76E-13
LD-HVO-0475-02-D	345	29-Nov-88	3.28E-13
LD-HVO-0476-02-D	345	29-Nov-88	1.13E-13
LD-HVO-0477-02-D	345	29-Nov-88	1.35E-13
LD-HVO-0478-02-D	345	29-Nov-88	1.13E-13
LD-HVO-0479-02-D	345	29-Nov-88	1.39E-13
LD-LPO-0480-02-B	345	29-Nov-88	1.03E-12
LD-LPO-0481-02-D	345	29-Nov-88	4.82E-13
LD-HVO-0482-02-D	345	30-Nov-88	1.89E-13
LD-HVO-0483-02-D	345	30-Nov-88	1.52E-13
LD-HVO-0484-02-D	345	30-Nov-88	1.76E-13
LD-HVO-0485-02-D	345	30-Nov-88	2.38E-13

Sample ID	Location	Samp Date	Alpha Act. (μCi/ml)
LD-HVO-0486-02-D	345	30-Nov-88	1.13E-13
LD-HVO-0487-02-D	345	30-Nov-88	2.14E-13
LD-HVO-0488-02-D	345	30-Nov-88	3.76E-13
LD-HVO-0489-02-D	345	30-Nov-88	2.27E-13
LD-HVO-0490-02-D	345	30-Nov-88	2.51E-14
LD-HVO-0491-02-D	345	30-Nov-88	1.64E-13
LD-HVO-0492-02-D	345	30-Nov-88	1.49E-13
LD-LPO-0493-02-D	345	30-Nov-88	5.24E-13
LD-HVO-0494-02-D	345	1-Dec-88	2.08E-13
LD-HVO-0495-02-D	345	1-Dec-88	1.51E-13
LD-HVO-0496-02-D	345	1-Dec-88	3.67E-13
LD-HVO-0497-05-B	345	1-Dec-88	1.89E-13
LD-HVO-0498-05-B	345	1-Dec-88	2.33E-13
LD-HVO-0499-05-B	345	1-Dec-88	2.90E-13
LD-HVO-0500-05-B	345	1-Dec-88	2.33E-13
LD-HVO-0501-01-E	345	1-Dec-88	1.89E-13
LD-HVO-0502-01-E	345	1-Dec-88	3.89E-13
LD-HVO-0508-01-E	345	2-Dec-88	1.34E-13
LD-HVO-0509-01-E	345	2-Dec-88	9.83E-14
LD-HVO-0510-01-E	345	2-Dec-88	1.87E-13
LD-LPO-0516-01-E	345	2-Dec-88	3.63E-13
LD-LPO-0517-01-E	345	2-Dec-88	4.55E-13
LD-HVO-0511-01-E	345	3-Dec-88	2.38E-13
LD-HVO-0512-01-E	345	3-Dec-88	8.03E-14
LD-HVO-0513-01-E	345	3-Dec-88	3.52E-13
LD-HVO-0514-01-E	345	3-Dec-88	1.60E-13
LD-HVO-0515-01-E	345	3-Dec-88	1.51E-13
LD-HVO-0518-01-E	345	3-Dec-88	1.34E-13
LD-HVO-0519-01-E	345	3-Dec-88	1.34E-13
LD-HVO-0520-01-E	345	3-Dec-88	1.61E-13
LD-HVO-0521-02-F	345	3-Dec-88	4.00E-14
LD-HVO-0522-02-F	345	3-Dec-88	2.68E-13
LD-HVO-0523-02-F	345	3-Dec-88	1.07E-13
LD-HVO-0524-02-F	345	3-Dec-88	3.78E-14
LD-HVO-0525-02-F	345	3-Dec-88	1.87E-13
LD-HVO-0526-02-F	345	3-Dec-88	1.64E-13
LD-HVO-0527-02-F	345	3-Dec-88	2.27E-13
LD-HVO-0528-02-F	345	3-Dec-88	2.77E-13
LD-LPO-0529-02-F	345	3-Dec-88	7.02E-14
LD-LPO-0530-02-F	345	3-Dec-88	1.74E-12
LD-LPO-0531-02-F	345	3-Dec-88	7.02E-13
LD-HVO-0572-04-A	345	5-Dec-88	2.01E-13
LD-HVO-0573-04-A	345	5-Dec-88	4.14E-13
LD-HVO-0574-04-B	345	5-Dec-88	7.55E-13
LD-HVO-0575-04-B	345	5-Dec-88	2.27E-13
LD-HVO-0576-04-B	345	5-Dec-88	2.77E-13
LD-HVO-0577-04-B	345	5-Dec-88	2.66E-13
LD-HVO-0578-05-B	345	5-Dec-88	2.51E-13
LD-HVO-0579-05-B	345	5-Dec-88	5.21E-13

Sample ID	Location	Samp Date	Alpha Act. (µCi/ml)
LD-HVO-0580-05-B	345	5-Dec-88	5.54E-13
LD-HVO-0581-05-B	345	5-Dec-88	1.61E-13
LD-HVO-0582-05-B	345	5-Dec-88	1.39E-13
LD-HVO-0583-06-B	345	5-Dec-88	2.40E-13
LD-HVO-0584-06-A	345	5-Dec-88	2.27E-13
LD-HVO-0585-06-A	345	5-Dec-88	6.80E-13
LD-LPO-0586-06-A	345	5-Dec-88	4.99E-13
LD-LPO-0587-06-A	345	5-Dec-88	4.16E-13
LD-HVO-0589-06-A	345	6-Dec-88	3.32E-13
LD-HVO-0590-06-B	345	6-Dec-88	2.06E-13
LD-HVO-0591-06-B	345	6-Dec-88	3.54E-13
LD-HVO-0592-06-A	345	6-Dec-88	1.39E-13
LD-HVO-0593-06-B	345	6-Dec-88	1.52E-13
LD-HVO-0594-07-B	345	6-Dec-88	2.19E-13
LD-HVO-0595-07-B	345	6-Dec-88	2.19E-13
LD-HVO-0596-07-A	345	6-Dec-88	1.37E-13
LD-HVO-0597-07-B	345	6-Dec-88	1.79E-13
LD-HVO-0598-07-A	345	6-Dec-88	3.01E-13
LD-HVO-0599-08-B	345	6-Dec-88	4.53E-14
LD-HVO-0600-08-B	345	6-Dec-88	2.51E-14
LD-HVO-0601-08-B	345	6-Dec-88	2.14E-13
LD-HVO-0602-08-B	345	6-Dec-88	3.76E-13
LD-LPO-0603-08-B	345	6-Dec-88	5.85E-13
LD-HVO-0532-07-A	345	7-Dec-88	1.12E-13
LD-HVO-0533-07-B	345	7-Dec-88	5.87E-14
LD-HVO-0534-08-A	345	7-Dec-88	8.56E-14
LD-HVO-0535-08-A	345	7-Dec-88	1.52E-13
LD-HVO-0536-08-B	3 5	7-Dec-88	5.35E-15
LD-HVO-0537-08-A	315	7-Dec-88	5.04E-15
LD-HVO-0538-08-B	345	7-Dec-88	1.12E-13
LD-HVO-0539-08-B	345	7-Dec-88	1.06E-13
LD-LPO-0588-06-A	345	7-Dec-88	5.35E-13
LD-APO-0547-09-B	347	8-Dec-88	2.75E-14
LD-APO-0548-09-A	347	8-Dec-88	1.20E-13
LD-APO-0549-09-A	347	8-Dec-88	3.65E-14
LD-APO-0550-09-B	347	8-Dec-88	4.11E-14
LD-HVO-0540-08-B	345	8-Dec-88	2.01E-13
LD-HVO-0541-09-B	347	8-Dec-88	2.46E-13
LD-HVO-0542-09-B	347	8-Dec-88	1.61E-13
LD-HVO-0543-09-A	347	8-Dec-88	1.69E-13
LD-HVO-0544-09-A	347	8-Dec-88	1.95E-13
LD-HVO-0545-09-A	347	8-Dec-88	2.55E-13
LD-HVO-0546-09-B	347	8-Dec-88	1.30E-13
LD-LPO-0551-09-B	347	8-Dec-88	2.27E-12
LD-APO-0552-11-A	347	9-Dec-88	4.97E-14
LD-APO-0553-11-A	347	9-Dec-88	5.81E-14
LD-APO-0554-11-A	347	9-Dec-88	8.56E-14
LD-APO-0555-11-A	347	9-Dec-88	4.51E-14
LD-APO-0556-11-A	347	9-Dec-88	3.76E-14

Sample ID	Location	Samp Date	Alpha Act. ($\mu Ci/ml$)
LD-APO-0557-11-A	347	9-Dec-88	4.18E-14
LD-APO-0558-11-B	347	9-Dec-88	2.05E-14
LD-APO-0559-11-B	347	9-Dec-88	4.51E-14
LD-LPO-0560-11-B	347	9-Dec-88	5.72E-13
LD-APO-0561-11-B	347	10-Dec-88	4.20E-14
LD-APO-0562-11-A	347	10-Dec-88	2.75E-14
LD-APO-0563-11-B	347	10-Dec-88	4.84E-14
LD-APO-0564-12-B	347	10-Dec-88	1.37E-14
LD-APO-0565-12-B	347	10-Dec-88	1.37E-14
LD-APO-0565-12-B	347	10-Dec-88	2.57E-14
LD-APO-0566-11-C	347	10-Dec-88	1.71E-14
LD-APO-0567-11-D	347	10-Dec-88	2.57E-14
LD-APO-0568-11-D	347	10-Dec-88	2.40E-14
LD-APO-0569-10-D	347	10-Dec-88	4.20E-14
LD-APO-0570-09-D	347	10-Dec-88	3.43E-15
LD-LPO-0571-09-D	347	10-Dec-88	3.98E-13
LD-APO-0605-10-D	347	11-Dec-88	3.43E-14
LD-APO-0606-10-C	347	11-Dec-88	1.71E-14
LD-APO-0607-08-D	347	11-Dec-88	3.08E-14
LD-APO-0608-07-D	347	11-Dec-88	1.71E-14
LD-APO-0609-06-D	345	11-Dec-88	4.44E-14
LD-APO-0610-06-D	345	11-Dec-88	2.40E-14
LD-APO-0611-06-A	345	11-Dec-88	4.44E-14
LD-APO-0612-06-C	345	11-Dec-88	2.40E-14
LD-LPO-0604-10-D	347	11-Dec-88	4.99E-13
LD-LPO-0613-06-D	345	11-Dec-88	4.66E-13
LD-APO-0614-06-C	345	12-Dec-88	5.15E-14
LD-APO-0615-06-D	345	12-Dec-88	5.83E-14
LD-APO-0616-06-D	345	12-Dec-88	9.24E-14
LD-APO-0617-06-D	345	12-Dec-88	3.08E-14
LD-APO-0618-06-C	345	12-Dec-88	3.43E-15
LD-APO-0619-06-D	345	12-Dec-88	6.51E-14
LD-APO-0620-06-D	345	12-Dec-88	1.03E-14
LD-APO-0621-06-D	345	12-Dec-88	4.11E-14
LD-LPO-0622-06-D	345	12-Dec-88	5.96E-13
LD-APO-0623-06-D	345	13-Dec-88	2.75E-14
LD-APO-0624-03-C	345	13-Dec-88	3.70E-14
LD-APO-0625-03-C	345	13-Dec-88	2.05E-14
LD-APO-0626-03-C	345	13-Dec-88	6.12E-14
LD-APO-0627-03-C	345	13-Dec-88	3.76E-14
LD-APO-0628-03-C	345	13-Dec-88	2.90E-14
LD-APO-0629-05-R	345	13-Dec-88	2.57E-14
LD-APO-0631-05-E	345	14-Dec-88	1.37E-13
LD-APO-0632-05-E	345	14-Dec-88	3.76E-14
LD-APO-0633-04-E	345	14-Dec-88	3.76E-14
LD-APO-0634-04-C	345	14-Dec-88	4.80E-14
LD-APO-0635-05-E	345	14-Dec-88	3.54E-14
LD-APO-0636-05-E	345	14-Dec-88	2.73E-14
LD-APO-0637-04-E	345	14-Dec-88	3.76E-14

Sample ID	Location	Samp Date	Alpha Act. (μCi/ml)
LD-LPO-0638-04-E	345	14-Dec-88	2.49E-16
LD-APO-0639-05-E	345	15-Dec-88	2.40E-14
LD-APO-0640-05-E	345	15-Dec-88	1.37E-14
LD-APO-0641-05-E	345	15-Dec-88	<MDA
LD-APO-0642-05-G	345	15-Dec-88	2.05E-13
LD-APO-0643-03-E	345	15-Dec-88	2.05E-14
LD-APO-0644-02-D	345	15-Dec-88	<MDA
LD-APO-0645-02-P	345	15-Dec-88	3.08E-14
LD-LPO-0646-02-P	345	15-Dec-88	2.20E-13
LD-APO-0647-02-R	345	16-Dec-88	<MDA
LD-APO-0648-02-R	345	16-Dec-88	5.48E-14
LD-APO-0649-02-R	345	16-Dec-88	1.37E-14
LD-APO-0650-02-P	345	16-Dec-88	3.41E-15
LD-APO-0651-03-N	345	16-Dec-88	1.37E-14
LD-LPO-0652-03-N	345	16-Dec-88	2.75E-13
LD-APO-0653-03-M	345	17-Dec-88	3.41E-15
LD-APO-0654-04-L	345	17-Dec-88	2.73E-14
LD-APO-0655-01-G	345	17-Dec-88	3.41E-14
LD-APO-0656-01-G	345	17-Dec-88	3.08E-14
LD-APO-0657-01-G	345	17-Dec-88	4.80E-14
LD-LPO-0658-01-G	345	17-Dec-88	3.23E-13
LD-APO-0659-04-G	345	19-Dec-88	2.73E-14
LD-APO-0660-04-G	345	19-Dec-88	2.40E-14
LD-APO-0661-03-L	345	19-Dec-88	4.44E-14
LD-APO-0662-04-G	345	19-Dec-88	3.41E-14
LD-LPO-0663-04-G	345	19-Dec-88	4.97E-13
LD-APO-0664-04-J	345	20-Dec-88	6.84E-15
LD-APO-0665-04-J	345	20-Dec-88	2.73E-14
LD-APO-0666-04-J	345	20-Dec-88	1.03E-14
LD-APO-0667-04-K	345	20-Dec-88	3.41E-15
LD-APO-0668-04-K	345	20-Dec-88	6.84E-15
LD-APO-0669-04-K	345	20-Dec-88	1.71E-14
LD-APO-0670-02-A	345	21-Dec-88	4.99E-14
LD-APO-0671-02-A	345	21-Dec-88	1.71E-14
LD-LPO-0672-02-A	345	21-Dec-88	5.72E-13
LD-APO-0674-04-CA	345	3-Jan-89	6.84E-15
LD-APO-0675-05-CA	345	3-Jan-89	2.33E-14
LD-APO-0676-05-CA	345	3-Jan-89	6.84E-15
LD-APO-0677-05-CA	345	3-Jan-89	2.33E-14
LD-LPO-0673-04-C	345	3-Jan-89	3.94E-13
LD-APO-0679-03-CA	345	4-Jan-89	3.43E-15
LD-APO-0680-03-CA	345	4-Jan-89	4.44E-14
LD-APO-0681-05-CA	345	4-Jan-89	7.96E-13
LD-APO-0682-05-CA	345	4-Jan-89	2.05E-14
LD-APO-0683-03-CA	345	4-Jan-89	<MDA
LD-LPO-0678-03-CA	345	4-Jan-89	2.66E-13
LD-APO-0685-04-CA	345	5-Jan-89	1.99E-14
LD-APO-0686-05-CA	345	5-Jan-89	1.33E-14
LD-APO-0687-05-CA	345	5-Jan-89	<MDA

Sample ID	Location	Samp Date	Alpha Act. (μCi/ml)
LD-APO-0688-05-CA	345	5-Jan-89	6.64E-15
LD-LPO-0684-04-CA	345	5-Jan-89	<MDA
LD-APO-0690-07-CB	345	6-Jan-89	1.29E-14
LD-LPO-0689-04-CB	345	6-Jan-89	1.93E-12
LD-APO-0692-09-CA	347	7-Jan-89	6.45E-15
LD-APO-0693-08-CA	345	7-Jan-89	1.61E-14
LD-APO-0694-09-CA	347	7-Jan-89	<MDA
LD-APO-0695-09-CA	347	7-Jan-89	<MDA
LD-LPO-0691-08-CA	345	7-Jan-89	<MDA
LD-APO-0697-04-A	345	9-Jan-89	1.55E-14
LD-APO-0698-09-CA	347	9-Jan-89	2.31E-15
LD-APO-0699-06-A	345	9-Jan-89	2.29E-14
LD-APO-0700-06-A	345	9-Jan-89	1.12E-14
LD-APO-0701-06-A	345	9-Jan-89	1.33E-14
LD-LPO-0696-09-CA	347	9-Jan-89	2.31E-13
LD-APO-0738-02-KA	347	14-Jan-89	5.72E-14
LD-APO-0739-02-KA	347	14-Jan-89	3.74E-14
LD-APO-0740-02-KA	347	14-Jan-89	3.30E-14
LD-APO-0741-02-KA	347	14-Jan-89	2.64E-14
LD-APO-0742-07-GA	347	14-Jan-89	6.38E-15
LD-APO-0743-07-GA	347	14-Jan-89	1.72E-14
LD-APO-0744-07-GA	347	14-Jan-89	6.38E-15
LD-APO-0745-07-GA	347	14-Jan-89	3.52E-14
LD-APO-0746-07-GA	347	14-Jan-89	2.20E-14
LD-APO-0756-05-C	345	17-Jan-89	3.52E-14
LD-APO-0757-05-C	345	17-Jan-89	4.62E-14
LD-APO-0758-05-C	345	17-Jan-89	2.00E-14
LD-APO-0759-05-C	345	17-Jan-89	3.08E-14
LD-LPO-0755-05-C	345	17-Jan-89	3.74E-13
LD-APO-0760-02-KA	347	18-Jan-89	<MDA
LD-APO-0761-02-KA	347	18-Jan-89	5.94E-14
LD-APO-0762-02-KA	347	18-Jan-89	3.52E-14
LD-APO-0763-05-KA	347	18-Jan-89	<MDA
LD-APO-0765-02-GB	347	19-Jan-89	1.03E-13
LD-APO-0766-08-CB	345	19-Jan-89	<MDA
LD-APO-0767-09-CB	347	19-Jan-89	<MDA
LD-APO-0768-11-CB	347	19-Jan-89	4.62E-14
LD-LPO-0764-12-CB	347	19-Jan-89	6.16E-13
LD-APO-0770-12-CB	347	20-Jan-89	1.61E-14
LD-APO-0771-12-A	347	20-Jan-89	2.86E-14
LD-APO-0772-01-GA	347	20-Jan-89	2.20E-14
LD-APO-0773-01-KA	347	20-Jan-89	6.38E-14
LD-LPO-0769-14-A	347	20-Jan-89	1.96E-12
LD-APO-0775-13-C	347	21-Jan-89	6.16E-14
LD-LPO-0774-13-C	347	21-Jan-89	5.50E-13
LD-APO-0780-14-E	347	23-Jan-89	3.52E-14
LD-APO-0781-14-B	347	23-Jan-89	7.70E-14
LD-APO-0782-14-J	347	23-Jan-89	2.86E-14
LD-LPO-0799-14-E	347	23-Jan-89	3.30E-13

Sample ID	Location	Samp Date	Alpha Act. (μCi/ml)
LD-APO-0784-11-H	347	24-Jan-89	1.87E-14
LD-APO-0785-11-E	347	24-Jan-89	3.52E-14
LD-APO-0786-11-F	347	24-Jan-89	2.18E-14
LD-APO-0787-11-F	347	24-Jan-89	1.87E-14
LD-LPO-0783-11-E	347	24-Jan-89	2.20E-13
LD-APO-0789-11-J	347	25-Jan-89	6.38E-15
LD-APO-0790-11-J	347	25-Jan-89	3.30E-14
LD-APO-0791-12-K	347	25-Jan-89	3.30E-14
LD-APO-0792-10-B	347	25-Jan-89	3.30E-15
LD-LPO-0788-11-J	347	25-Jan-89	6.38E-14
LD-LPO-0793-10-B	347	26-Jan-89	5.72E-13
LD-APO-0795-07-E	345	27-Jan-89	3.52E-14
LD-APO-0796-07-E	345	27-Jan-89	3.96E-14
LD-APO-0797-09-E	347	27-Jan-89	3.52E-14
LD-APO-0798-07-C	345	27-Jan-89	1.94E-14
LD-LPO-0794-05-C	345	27-Jan-89	7.04E-14
LD-APO-0800-07-B	345	28-Jan-89	9.68E-15
LD-APO-0801-06-C	345	28-Jan-89	3.96E-14
LD-APO-0802-06-C	345	28-Jan-89	9.68E-15
LD-LPO-0799-03-D	345	28-Jan-89	1.89E-13
LD-APO-0804-06-A	345	31-Jan-89	2.64E-14
LD-APO-0805-06-S	345	31-Jan-89	4.84E-14
LD-LPO-0803-06-A	345	31-Jan-89	1.01E-13
LD-LPO-0812-00-A	347	2-Feb-89	1.23E-13
LD-LPO-0823-00-A	347	6-Feb-89	9.28E-14
LD-LPO-0840-00-A	347	7-Feb-89	3.61E-13
LD-LPO-0850-00-A	347	8-Feb-89	9.61E-13
LD-LPO-0859-00-A	347	9-Feb-89	6.36E-13
LD-APO-1039-01-A	047	1-Mar-89	3.76E-14
LD-APO-1040-01-A	047	1-Mar-89	1.28E-14
LD-APO-1041-14-D	347	1-Mar-89	<MDA
LD-APO-1042-01-A	347	2-Mar-89	<MDA
LD-APO-1043-01-A	347	2-Mar-89	9.39E-15
LD-APO-1044-01-A	347	2-Mar-89	<MDA
LD-APO-1045-01-A	347	2-Mar-89	1.88E-14
LD-APO-1062-13-F	347	9-Mar-89	<MDA
LD-APO-1063-13-F	347	9-Mar-89	2.75E-14
LD-APO-1064-13-J	347	9-Mar-89	3.04E-14
LD-APO-1065-13-J	347	9-Mar-89	1.83E-14
LD-APO-1066-13-J	347	10-Mar-89	8.91E-15
LD-APO-1067-13-A	347	10-Mar-89	1.22E-14
LD-APO-1068-13-A	347	10-Mar-89	1.83E-14
LD-APO-1069-13-A	347	10-Mar-89	<MDA
LD-APO-1078-11-F	347	13-Mar-89	3.32E-15
LD-APO-1079-11-F	347	13-Mar-89	6.64E-15
LD-APO-1080-08-H	345	13-Mar-89	<MDA
LD-APO-1081-08-H	345	13-Mar-89	3.08E-14
LD-LPO-1082-00-A	347	13-Mar-89	1.08E-13
LD-APO-1086-07-E	345	14-Mar-89	<MDA

Sample ID	Location	Samp Date	Alpha Act. (μCi/ml)
LD-APO-1087-09-G	347	14-Mar-89	<MDA
LD-LPO-1088-00-A	347	14-Mar-89	5.54E-13
LD-APO-1090-09-H	347	15-Mar-89	3.04E-14
LD-APO-1091-09-H	347	15-Mar-89	1.88E-14
LD-APO-1092-10-K	347	15-Mar-89	<MDA
LD-APO-1093-10-K	347	15-Mar-89	<MDA
LD-LPO-1094-01-A	345	15-Mar-89	3.08E-13
LD-LPO-1095-01-A	345	15-Mar-89	7.96E-14
LD-APO-1096-08-K	345	16-Mar-89	<MDA
LD-APO-1097-08-K	345	16-Mar-89	<MDA
LD-APO-1098-09-K	347	16-Mar-89	<MDA
LD-APO-1101-09-R	347	17-Mar-89	3.32E-15
LD-APO-1103-09-N	347	17-Mar-89	3.32E-15
LD-APO-1104-07-L	345	17-Mar-89	<MDA
LD-LPO-1105-09-N	347	17-Mar-89	<MDA
LD-LPO-1106-09-C	347	17-Mar-89	<MDA
LD-APO-1107-08-L	345	18-Mar-89	3.21E-15
LD-APO-1108-07-R	345	18-Mar-89	1.61E-14
LD-APO-1109-07-P	345	18-Mar-89	9.68E-15
LD-APO-1110-07-P	345	18-Mar-89	1.93E-14
LD-LPO-1111-07-S	345	18-Mar-89	2.73E-13
LD-LPO-1112-07-S	345	18-Mar-89	2.00E-13
LD-APO-1113-07-P	345	20-Mar-89	1.66E-14
LD-APO-1114-07-M	345	20-Mar-89	1.71E-14
LD-APO-1115-04-R	345	20-Mar-89	<MDA
LD-APO-1116-04-R	345	20-Mar-89	6.64E-15
LD-APO-1117-03-R	345	20-Mar-89	2.33E-14
LD-APO-1118-07-G	345	20-Mar-89	6.45E-15
LD-APO-1119-06-E	345	20-Mar-89	3.21E-15
LD-LPO-1120-05-B	345	20-Mar-89	2.14E-13
LD-LPO-1121-04-R	345	20-Mar-89	2.18E-13
LD-APO-1123-04-D	345	21-Mar-89	<MDA
LD-APO-1124-04-P	345	21-Mar-89	<MDA
LD-APO-1125-04-P	345	21-Mar-89	<MDA
LD-LPO-1126-05-B	345	21-Mar-89	1.04E-14
LD-APO-1127-04-E	345	22-Mar-89	2.05E-14
LD-APO-1128-04-B	345	22-Mar-89	2.57E-14
LD-APO-1129-06-B	345	22-Mar-89	1.61E-14
LD-APO-1130-05-B	345	22-Mar-89	9.68E-15
LD-LPO-1131-01-A	345	22-Mar-89	4.22E-13
LD-LPO-1132-01-A	345	22-Mar-89	1.70E-13
LD-APO-1133-05-B	345	23-Mar-89	1.03E-14
LD-APO-1134-05-C	345	23-Mar-89	3.43E-15
LD-APO-1135-04-S	345	23-Mar-89	1.66E-14
LD-APO-1136-06-D	345	23-Mar-89	2.05E-14
LD-LPO-1137-01-A	345	23-Mar-89	1.80E-13
LD-LPO-1138-01-A	345	23-Mar-89	2.57E-13
LD-APO-1139-04-S	345	27-Mar-89	2.05E-14
LD-APO-1140-06-D	345	27-Mar-89	3.43E-15

Sample ID	Location	Samp Date	Alpha Act. (μCi/ml)
LD-APO-1141-05-D	345	27-Mar-89	2.73E-14
LD-APO-1143-06-D	345	27-Mar-89	<MDA
LD-HVO-1142-12-V	347	27-Mar-89	2.64E-13
LD-HVO-1144-19-V	347	27-Mar-89	2.33E-13
LD-HVO-1145-04-S	345	27-Mar-89	1.55E-13
LD-LPO-1146-01-A	345	27-Mar-89	8.36E-14
LD-LPO-1147-01-A	345	27-Mar-89	1.88E-13
LD-HVO-1180-04-S	345	28-Mar-89	1.70E-13
LD-HVO-1181-07-V	345	28-Mar-89	9.04E-14
LD-HVO-1182-06-E	345	28-Mar-89	2.17E-13
LD-HVO-1183-06-E	345	28-Mar-89	3.41E-13
LD-HVO-1184-05-F	345	28-Mar-89	2.49E-13
LD-HVO-1185-04-S	345	28-Mar-89	1.39E-13
LD-HVO-1186-07-V	345	28-Mar-89	<MDA
LD-LPO-1187-01-A	345	28-Mar-89	1.38E-13
LD-LPO-1188-01-A	345	28-Mar-89	9.13E-14
LD-HVO-1148-05-F	345	29-Mar-89	1.12E-13
LD-HVO-1149-04-F	345	29-Mar-89	1.92E-13
LD-HVO-1150-06-F	345	29-Mar-89	1.76E-13
LD-HVO-1151-07-V	345	29-Mar-89	1.24E-13
LD-HVO-1152-07-V	345	29-Mar-89	2.49E-13
LD-LPO-1153-01-A	345	29-Mar-89	4.27E-13
LD-LPO-1154-01-A	345	29-Mar-89	3.63E-13
LD-HVO-1155-04-S	345	30-Mar-89	1.39E-13
LD-HVO-1156-05-G	345	30-Mar-89	1.55E-13
LD-HVO-1157-05-G	345	30-Mar-89	2.95E-13
LD-HVO-1158-03-S	345	30-Mar-89	1.86E-13
LD-HVO-1159-05-H	345	30-Mar-89	2.01E-13
LD-HVO-1160-07-V	345	30-Mar-89	3.56E-13
LD-LPO-1161-01-A	345	30-Mar-89	4.03E-13
LD-LPO-1162-01-A	345	30-Mar-89	8.27E-13
LD-HVO-1163-04-S	345	31-Mar-89	4.03E-14
LD-HVO-1164-05-H	345	31-Mar-89	1.33E-13
LD-HVO-1165-05-J	345	31-Mar-89	2.57E-13
LD-HVO-1166-04-S	345	31-Mar-89	1.12E-13
LD-HVO-1167-06-V	345	31-Mar-89	1.28E-13
LD-HVO-1168-06-V	345	31-Mar-89	4.91E-13
LD-HVO-1169-06-V	345	31-Mar-89	5.06E-13
LD-LPO-1170-01-A	345	31-Mar-89	5.85E-13
LD-LPO-1171-01-A	345	31-Mar-89	3.59E-13
LD-HVO-1172-04-S	345	1-Apr-89	5.13E-13
LD-HVO-1173-06-L	345	1-Apr-89	2.08E-13
LD-HVO-1174-08-V	345	1-Apr-89	1.76E-13
LD-HVO-1175-06-K	345	1-Apr-89	9.59E-14
LD-HVO-1176-06-L	345	1-Apr-89	2.08E-13
LD-HVO-1177-04-S	345	1-Apr-89	1.60E-13
LD-LPO-1178-01-A	345	1-Apr-89	3.08E-13
LD-LPO-1179-01-A	345	1-Apr-89	6.05E-13
LD-HVO-1191-20-V	347	5-Apr-89	1.20E-13

Sample ID	Location	Samp Date	Alpha Act. (μCi/ml)
LD-HVO-1192-06-S	345	5-Apr-89	6.40E-14
LD-HVO-1193-06-S	345	5-Apr-89	9.59E-14
LD-HVO-1194-05-P	345	5-Apr-89	6.40E-14
LD-HVO-1195-04-S	345	5-Apr-89	1.60E-13
LD-LPO-1196-01-A	345	5-Apr-89	1.59E-13
LD-APO-1199-21-V	347	7-Apr-89	3.54E-15
LD-APO-1200-21-V	347	7-Apr-89	7.06E-15
LD-APO-1201-05-S	345	7-Apr-89	<MDA
LD-APO-1202-03-S	345	7-Apr-89	7.06E-15
LD-APO-1203-17-V	347	7-Apr-89	2.12E-14
LD-HVO-1197-04-P	345	7-Apr-89	4.31E-13
LD-HVO-1198-04-S	345	7-Apr-89	<MDA
LD-LPO-1204-01-A	345	7-Apr-89	<MDA
LD-APO-1205-20-V	347	10-Apr-89	<MDA
LD-APO-1206-18-V	347	10-Apr-89	2.82E-14
LD-APO-1207-20-V	347	10-Apr-89	2.82E-14
LD-LPO-1208-01-A	347	10-Apr-89	<MDA
LD-APO-1209-04-P	345	11-Apr-89	4.25E-14
LD-APO-1210-04-P	345	11-Apr-89	1.06E-14
LD-APO-1211-04-P	345	11-Apr-89	2.46E-14
LD-APO-1212-17-V	347	11-Apr-89	<MDA
LD-APO-1213-15-V	347	11-Apr-89	3.19E-14
LD-APO-1214-05-R	345	12-Apr-89	3.08E-14
LD-APO-1215-05-R	345	12-Apr-89	2.05E-14
LD-APO-1216-05-S	345	12-Apr-89	2.40E-14
LD-APO-1217-12-V	345	12-Apr-89	1.03E-14
LD-APO-1218-05-V	345	12-Apr-89	2.05E-14
LD-APO-1219-04-V	345	12-Apr-89	2.73E-14
LD-LPO-1220-01-A	345	12-Apr-89	8.45E-14
LD-APO-1221-10-V	347	13-Apr-89	4.22E-15
LD-APO-1222-10-V	347	13-Apr-89	1.13E-14
LD-LPO-1223-01-A	347	13-Apr-89	1.18E-14
LD-APO-1224-11-V	347	14-Apr-89	3.54E-14
LD-APO-1225-09-V	347	14-Apr-89	4.11E-14
LD-APO-1228-25-V	347	17-Apr-89	1.03E-14
LD-APO-1229-17-V	347	17-Apr-89	2.12E-14
LD-HVO-1227-07-V	345	17-Apr-89	3.89E-14
LD-APO-1230-12-V	347	18-Apr-89	4.60E-14
LD-APO-1231-02-BC	345	19-Apr-89	2.82E-14
LD-APO-1232-07-V	345	19-Apr-89	1.41E-14
LD-APO-1233-04-BB	345	19-Apr-89	1.77E-14
LD-APO-1234-04-BB	345	19-Apr-89	3.89E-14
LD-APO-1235-04-BB	345	19-Apr-89	3.89E-14
LD-APO-1236-08-V	345	19-Apr-89	4.25E-14
LD-LPO-1237-01-A	345	19-Apr-89	1.10E-12
LD-APO-1238-04-C	345	20-Apr-89	1.03E-13
LD-APO-1239-04-C	345	20-Apr-89	2.73E-14
LD-APO-1241-03-D	345	20-Apr-89	2.40E-14
LD-APO-1242-04-E	345	20-Apr-89	1.03E-14

Sample ID	Location	Samp Date	Alpha Act. (μCi/ml)
LD-APO-1243-04-D	345	20-Apr-89	3.76E-14
LD-APO-1244-04-C	345	20-Apr-89	4.80E-14
LD-HVO-1240-09-V	345	20-Apr-89	1.38E-14
LD-LPO-1245-03-B	345	20-Apr-89	5.98E-13
LD-APO-1264-04-CC	345	21-Apr-89	3.28E-14
LD-APO-1265-04-CC	345	21-Apr-89	5.10E-14
LD-APO-1266-04-CC	345	21-Apr-89	3.65E-14
LD-APO-1267-04-CC	345	21-Apr-89	1.83E-14
LD-HVO-1268-14-V	347	21-Apr-89	9.92E-14
LD-LPO-1269-05-CC	345	21-Apr-89	1.37E-13
LD-APO-1247-05-C	345	22-Apr-89	2.86E-14
LD-APO-1248-05-D	345	22-Apr-89	3.30E-14
LD-HVO-1246-05-V	345	22-Apr-89	2.49E-13
LD-HVO-1249-18-V	347	22-Apr-89	1.41E-13
LD-HVO-1250-04-C	345	22-Apr-89	1.16E-13
LD-HVO-1251-03-D	345	22-Apr-89	9.92E-14
LD-LPO-1252-01-A	345	22-Apr-89	1.37E-15
LD-APO-1254-04-D	345	24-Apr-89	5.94E-14
LD-APO-1255-03-CC	345	24-Apr-89	3.74E-14
LD-APO-1256-04-CE	345	24-Apr-89	3.74E-14
LD-APO-1257-04-CD	345	24-Apr-89	8.14E-14
LD-HVO-1253-18-V	345	24-Apr-89	4.84E-13
LD-LPO-1258-01-A	345	24-Apr-89	7.04E-14
LD-HVO-1259-02-BD	345	25-Apr-89	5.72E-13
LD-HVO-1260-04-CB	345	25-Apr-89	6.60E-14
LD-HVO-1261-04-BD	345	25-Apr-89	6.60E-14
LD-HVO-1262-04-BD	345	26-Apr-89	1.11E-12
LD-HVO-1263-03-BD	345	26-Apr-89	2.64E-13
LD-LPO-1262-01-A	345	26-Apr-89	1.27E-12
LD-HVO-1293-12-V	347	3-May-89	4.31E-13
LD-HVO-1287-10-V	347	4-May-89	1.39E-13
LD-HVO-1291-08-V	345	4-May-89	4.31E-13
LD-HVO-1292-12-V	347	5-May-89	7.99E-14
LD-HVO-1288-12-V	347	6-May-89	9.31E-14
LD-HVO-1289-12-V	347	6-May-89	1.39E-13
LD-HVO-1290-07-V	345	6-May-89	<MDA
LD-HVO-1283-07-V	345	8-May-89	1.70E-13
LD-HVO-1284-01-V	345	8-May-89	3.10E-14
LD-HVO-1285-01-V	345	8-May-89	<MDA
LD-HVO-1286-12-V	347	8-May-89	1.70E-13

OCCUPATIONAL AIR SAMPLE RESULTS
DAILY AVERAGE ACTIVITY CONCENTRATION

Date	Daily Avg. Act. (μCi/ml)
19-Nov-88	1.64E-13
23-Nov-88	4.81E-13
3-Dec-88	3.83E-13
11-Dec-88	2.95E-13
17-Dec-88	1.80E-13
21-Dec-88	1.38E-13
7-Jan-88	1.47E-13
14-Jan-88	9.14E-14
21-Jan-88	1.43E-13
28-Jan-88	1.12E-13
2-Feb-88	9.33E-14
9-Feb-88	3.03E-13
2-Mar-88	1.57E-13
10-Mar-88	8.58E-14
18-Mar-88	7.27E-14
23-Mar-88	6.97E-14
1-Apr-88	1.50E-13
7-Apr-88	1.15E-13
14-Apr-88	6.93E-14
22-Apr-88	8.63E-14
26-Apr-88	2.15E-13
6-May-88	2.01E-13
8-May-88	1.47E-13

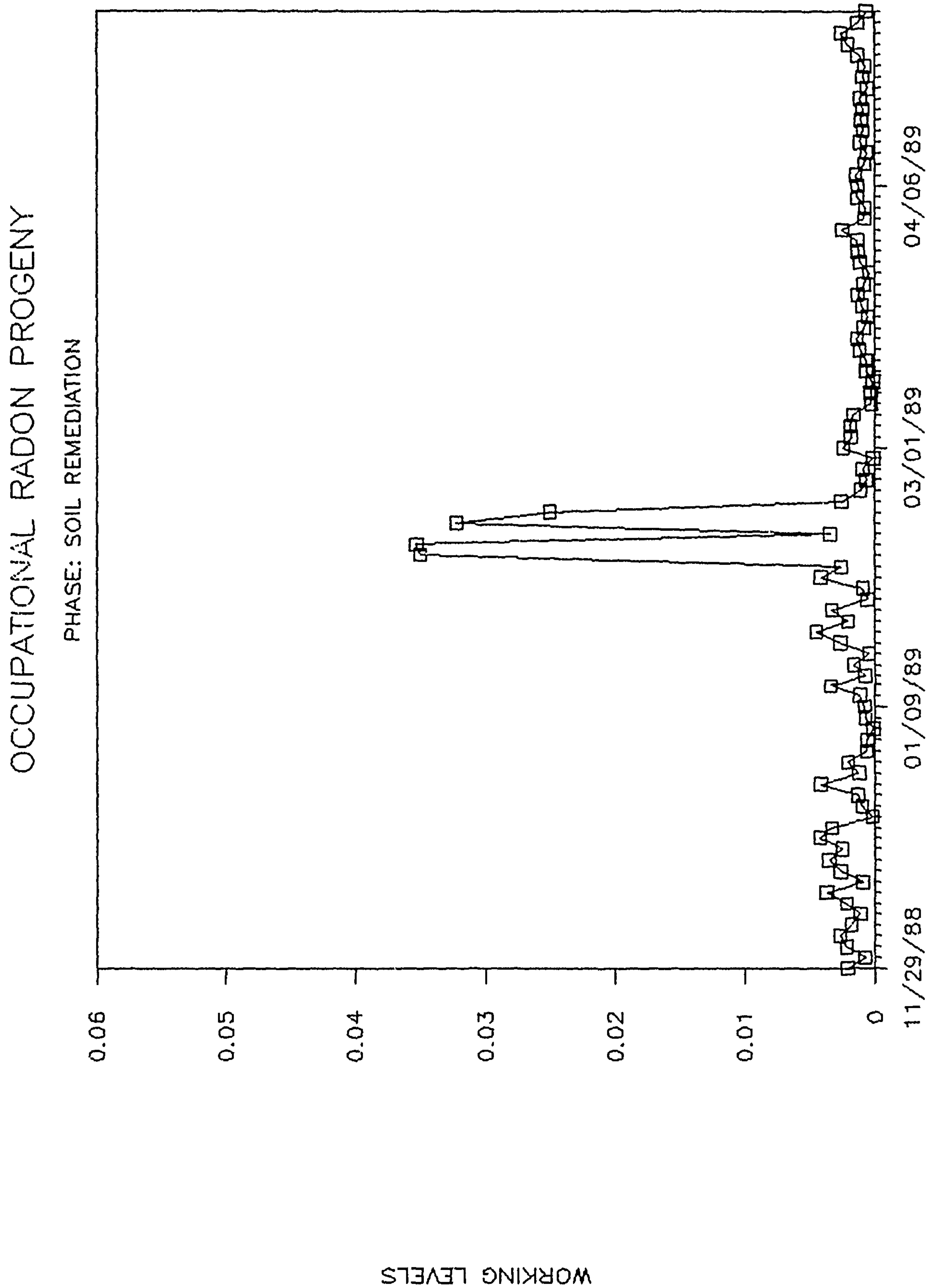


FIGURE N.3 OCCUPATIONAL WL

6-A-223

OCCUPATIONAL RADON PROGENY DATA (WORKING LEVELS)

PHASE: SOIL REMEDIATION

Sample ID	Date	Time	Conc.(WL)
LD-WLO-0100	29-Nov-88	1521	2.08E-03
LD-WLO-0102	30-Nov-88	728	7.42E-04
LD-WLO-0104	1-Dec-88	945	2.10E-03
LD-WLO-0105	1-Dec-88	1250	2.18E-03
LD-WLO-0107	2-Dec-88	1133	2.69E-03
LD-WLO-0109	3-Dec-88	1005	1.78E-03
LD-WLO-0112	5-Dec-88	830	3.82E-04
LD-WLO-0113	5-Dec-88	1535	1.80E-03
LD-WLO-0115	6-Dec-88	807	2.16E-03
LD-WLO-0117	7-Dec-88	818	3.70E-03
LD-WLO-0118	8-Dec-88	716	9.20E-04
LD-WLO-0122	9-Dec-88	835	4.96E-03
LD-WLO-0124	9-Dec-88	1538	2.74E-04
LD-WLO-0125	12-Dec-88	1020	4.89E-03
LD-WLO-0128	12-Dec-88	1110	2.10E-03
LD-WLO-0131	13-Dec-88	815	1.29E-03
LD-WLO-0133	13-Dec-88	1553	3.67E-03
LD-WLO-0135	14-Dec-88	732	4.20E-03
LD-WLO-0136	15-Dec-88	700	6.48E-04
LD-WLO-0137	15-Dec-88	815	5.94E-03
LD-WLO-0140	16-Dec-88	1510	1.72E-04
LD-WLO-0142	17-Dec-88	1050	9.73E-04
LD-WLO-0144	19-Dec-88	1420	1.29E-03
LD-WLO-0146	20-Dec-88	810	4.13E-03
LD-WLO-0149	21-Dec-88	750	1.19E-03
LD-WLO-0151	3-Jan-88	935	2.03E-03
LD-WLO-0153	4-Jan-88	820	6.00E-04
LD-WLO-0155	5-Jan-88	1343	5.74E-04
LD-WLO-0157	6-Jan-88	719	9.48E-05
LD-WLO-0161	7-Jan-88	933	6.99E-04
LD-WLO-0164	9-Jan-88	746	7.66E-04
LD-WLO-0166	10-Jan-88	710	1.09E-03
LD-WLO-0169	11-Jan-88	703	3.37E-03
LD-WLO-0171	13-Jan-88	739	8.27E-04
LD-WLO-0174	13-Jan-88	1554	6.49E-04
LD-WLO-0176	14-Jan-88	704	2.03E-03
LD-WLO-0178	14-Jan-88	1510	1.18E-03
LD-WLO-0180	16-Jan-88	739	4.10E-04
LD-WLO-0182	16-Jan-88	1505	3.80E-04
LD-WLO-0183	17-Jan-88	710	5.20E-03
LD-WLO-0186	17-Jan-88	1510	5.90E-05
LD-WLO-0187	18-Jan-88	700	4.50E-03
LD-WLO-0190	19-Jan-88	725	2.90E-03
LD-WLO-0192	19-Jan-88	1353	1.20E-03
LD-WLO-0194	20-Jan-88	755	3.30E-03
LD-WLO-0196	21-Jan-88	745	5.50E-04

Sample ID	Date	Time	Conc.(WL)
LD-WLO-0200	23-Jan-88	845	8.50E-04
LD-WLO-0201	23-Jan-88	1305	6.20E-04
LD-WLO-0203	24-Jan-88	730	7.30E-03
LD-WLO-0206	24-Jan-88	1325	9.50E-04
LD-WLO-0207	25-Jan-88	720	1.60E-03
LD-WLO-0209	25-Jan-88	1046	3.60E-03
LD-WLO-0210	25-Jan-88	1049	2.60E-03
LD-WLO-0214	25-Jan-88	1318	5.30E-04
LD-WLO-0215	26-Jan-88	739	5.00E-02
LD-WLO-0216	26-Jan-88	743	5.50E-02
LD-WLO-0218	26-Jan-88	1240	<MDA
LD-WLO-0219	27-Jan-88	715	5.60E-04
LD-WLO-0221	27-Jan-88	1109	6.70E-02
LD-WLO-0222	27-Jan-88	1113	7.20E-02
LD-WLO-0223	27-Jan-88	1515	1.80E-03
LD-WLO-0225	28-Jan-88	730	3.40E-03
LD-WLO-0228	31-Jan-88	656	1.40E-03
LD-WLO-0230	31-Jan-88	953	6.30E-02
LD-WLO-0234	1-Feb-88	1010	4.30E-02
LD-WLO-0236	1-Feb-88	1300	7.10E-03
LD-WLO-0238	2-Feb-88	725	4.50E-03
LD-WLO-0240	2-Feb-88	1520	5.30E-04
LD-WLO-0242	6-Feb-88	755	5.60E-04
LD-WLO-0244	6-Feb-88	1527	1.50E-03
LD-WLO-0246	7-Feb-88	935	1.00E-03
LD-WLO-0248	7-Feb-88	1525	2.40E-04
LD-WLO-0249	8-Feb-88	735	2.82E-04
LD-WLO-0252	8-Feb-88	1455	1.58E-03
LD-WLO-0253	9-Feb-88	803	2.82E-04
LD-WLO-0256	9-Feb-88	1350	<MDA
LD-WLO-0311	1-Mar-88	1010	3.16E-03
LD-WLO-0312	1-Mar-88	1032	2.37E-03
LD-WLO-0313	1-Mar-88	1535	1.69E-03
LD-WLO-0314	2-Mar-88	947	2.70E-03
LD-WLO-0315	2-Mar-88	1000	1.34E-03
LD-WLO-0316	2-Mar-88	1318	1.69E-03
LD-WLO-0317	2-Mar-88	1500	1.47E-03
LD-WLO-0318	7-Mar-88	1034	2.22E-03
LD-WLO-0319	7-Mar-88	1040	4.60E-03
LD-WLO-0320	7-Mar-88	1515	8.54E-04
LD-WLO-0321	7-Mar-88	1516	1.99E-00
LD-WLO-0322	8-Mar-88	936	3.02E-03
LD-WLO-0323	8-Mar-88	1237	1.40E-03
LD-WLO-0324	8-Mar-88	1303	9.85E-04
LD-WLO-0325	8-Mar-88	1500	1.20E-03
LD-WLO-0326	9-Mar-88	810	1.88E-04
LD-WLO-0327	9-Mar-88	1018	3.13E-04
LD-WLO-0328	9-Mar-88	1300	1.88E-04
LD-WLO-0329	9-Mar-88	1507	3.13E-04
LD-WLO-0330	10-Mar-88	809	3.89E-04

Sample ID	Date	Time	Conc.(WL)
LD-WLO-0331	10-Mar-88	1235	3.89E-04
LD-WLO-0332	10-Mar-88	1315	2.59E-04
LD-WLO-0333	10-Mar-88	1500	1.30E-04
LD-WLO-0334	11-Mar-88	816	5.84E-05
LD-WLO-0335	11-Mar-88	1008	5.84E-05
LD-WLO-0336	11-Mar-88	1344	2.92E-04
LD-WLO-0337	11-Mar-88	1455	5.84E-05
LD-WLO-0339	13-Mar-88	1346	6.21E-04
LD-WLO-0343	14-Mar-88	746	3.28E-04
LD-WLO-0341	14-Mar-88	1517	8.75E-04
LD-WLO-0347	15-Mar-88	820	1.06E-03
LD-WLO-0345	15-Mar-88	1256	1.19E-03
LD-WLO-0348	16-Mar-88	814	1.69E-03
LD-WLO-0350	16-Mar-88	1404	9.66E-04
LD-WLO-0352	17-Mar-88	837	1.19E-03
LD-WLO-0354	17-Mar-88	1322	4.38E-04
LD-WLO-0357	20-Mar-88	801	2.59E-04
LD-WLO-0358	20-Mar-88	1337	7.78E-04
LD-WLO-0360	22-Mar-88	710	1.00E-03
LD-WLO-0361	22-Mar-88	1510	8.75E-04
LD-WLO-0363	23-Mar-88	723	1.56E-03
LD-WLO-0362	23-Mar-88	935	1.19E-03
LD-WLO-0364	23-Mar-88	1320	1.06E-03
LD-WLO-0365	23-Mar-88	1410	1.19E-03
LD-WLO-0369	27-Mar-88	725	1.00E-03
LD-WLO-0372	27-Mar-88	1520	6.25E-04
LD-WLO-0373	28-Mar-88	715	5.63E-04
LD-WLO-0375	28-Mar-88	1513	3.13E-04
LD-WLO-0378	29-Mar-88	716	1.09E-03
LD-WLO-0380	30-Mar-88	825	1.62E-03
LD-WLO-0381	30-Mar-88	825	1.37E-03
LD-WLO-0382	30-Mar-88	1325	1.12E-03
LD-WLO-0383	30-Mar-88	1339	1.00E-03
LD-WLO-0385	31-Mar-88	739	2.11E-03
LD-WLO-0384	31-Mar-88	1001	1.03E-03
LD-WLO-0387	31-Mar-88	1326	7.85E-04
LD-WLO-0389	1-Apr-88	715	5.43E-03
LD-WLO-0390	1-Apr-88	738	4.23E-04
LD-WLO-0388	1-Apr-88	808	1.51E-03
LD-WLO-0391	3-Apr-88	820	1.04E-03
LD-WLO-0392	3-Apr-88	944	4.83E-04
LD-WLO-0394	4-Apr-88	737	6.25E-04
LD-WLO-0393	4-Apr-88	820	7.50E-04
LD-WLO-0395	5-Apr-88	836	1.21E-03
LD-WLO-0396	5-Apr-88	1340	1.69E-03
LD-WLO-0397	5-Apr-88	1410	1.00E-03
LD-WLO-0398	6-Apr-88	1010	1.27E-03
LD-WLO-0399	6-Apr-88	1012	1.27E-03
LD-WLO-0401	7-Apr-88	755	1.50E-03
LD-WLO-0402	7-Apr-88	930	2.00E-03

Sample ID	Date	Time	Conc.(WL)
LD-WLO-0403	7-Apr-88	1430	8.75E-04
LD-WLO-0404	7-Apr-88	1459	1.25E-03
LD-WLO-0405	10-Apr-88	830	1.03E-03
LD-WLO-0406	10-Apr-88	1015	1.27E-03
LD-WLO-0407	10-Apr-88	1515	3.02E-04
LD-WLO-0408	10-Apr-88	1522	5.43E-04
LD-WLO-0409	11-Apr-88	752	2.41E-04
LD-WLO-0410	11-Apr-88	828	7.24E-04
LD-WLO-0411	11-Apr-88	1319	9.66E-04
LD-WLO-0412	11-Apr-88	1354	4.83E-04
LD-WLO-0413	11-Apr-88	1520	6.04E-04
LD-WLO-0414	12-Apr-88	740	1.34E-03
LD-WLO-0415	12-Apr-88	751	1.63E-03
LD-WLO-0417	12-Apr-88	1508	7.85E-04
LD-WLO-0416	12-Apr-88	1520	6.64E-04
LD-WLO-0418	13-Apr-88	820	5.00E-04
LD-WLO-0420	13-Apr-88	1304	8.68E-04
LD-WLO-0421	13-Apr-88	1408	1.21E-03
LD-WLO-0422	14-Apr-88	1110	1.00E-03
LD-WLO-0424	17-Apr-88	956	1.09E-03
LD-WLO-0425	17-Apr-88	1110	8.45E-04
LD-WLO-0426	17-Apr-88	1300	9.66E-04
LD-WLO-0427	17-Apr-88	1301	7.24E-04
LD-WLO-0429	18-Apr-88	955	1.20E-03
LD-WLO-0428	18-Apr-88	1000	1.51E-03
LD-WLO-0431	18-Apr-88	1326	9.37E-04
LD-WLO-0430	18-Apr-88	1350	7.85E-04
LD-WLO-0432	19-Apr-88	1005	5.99E-04
LD-WLO-0433	19-Apr-88	1036	7.28E-04
LD-WLO-0434	19-Apr-88	1408	4.14E-04
LD-WLO-0435	19-Apr-88	1505	4.69E-04
LD-WLO-0436	20-Apr-88	752	1.63E-03
LD-WLO-0437	20-Apr-88	818	1.03E-03
LD-WLO-0438	20-Apr-88	1520	6.79E-04
LD-WLO-0439	20-Apr-88	1525	3.02E-04
LD-WLO-0445	22-Apr-88	744	3.75E-04
LD-WLO-0440	22-Apr-88	802	1.51E-03
LD-WLO-0442	22-Apr-88	1345	6.04E-04
LD-WLO-0446	22-Apr-88	1511	1.25E-04
LD-WLO-0449	24-Apr-88	714	1.93E-03
LD-WLO-0451	24-Apr-88	1335	6.04E-04
LD-WLO-0451	25-Apr-88	724	3.50E-03
LD-WLO-0453	25-Apr-88	1415	6.25E-04
LD-WLO-0456	26-Apr-88	726	4.82E-03
LD-WLO-0457	26-Apr-88	1418	3.62E-04
LD-WLO-0459	27-Apr-88	755	1.50E-03
LD-WLO-0458	27-Apr-88	1500	1.00E-03
LD-WLO-0462	1-May-88	952	6.90E-04
LD-WLO-0463	1-May-88	1510	5.60E-04

OCCUPATIONAL RADON PROGENY DATA (WORKING LEVELS)
DAILY AVERAGES

Date	Conc. (WL)
29-Nov-88	2.08E-03
30-Nov-88	7.42E-04
1-Dec-88	2.14E-03
2-Dec-88	2.69E-03
3-Dec-88	1.78E-03
5-Dec-88	1.09E-03
6-Dec-88	2.16E-03
7-Dec-88	3.70E-03
8-Dec-88	9.20E-04
9-Dec-88	2.62E-03
12-Dec-88	3.50E-03
13-Dec-88	2.48E-03
14-Dec-88	4.20E-03
15-Dec-88	3.29E-03
16-Dec-88	1.72E-04
17-Dec-88	9.73E-04
19-Dec-88	1.29E-03
20-Dec-88	4.13E-03
21-Dec-88	1.19E-03
3-Jan-88	2.03E-03
4-Jan-88	6.00E-04
5-Jan-88	5.74E-04
6-Jan-88	9.48E-05
7-Jan-88	6.99E-04
9-Jan-88	7.66E-04
10-Jan-88	1.09E-03
11-Jan-88	3.37E-03
13-Jan-88	7.38E-04
14-Jan-88	1.60E-03
16-Jan-88	3.95E-04
17-Jan-88	2.63E-03
18-Jan-88	4.50E-03
19-Jan-88	2.05E-03
20-Jan-88	3.30E-03
21-Jan-88	5.50E-04
23-Jan-88	8.57E-04
24-Jan-88	4.12E-03
25-Jan-88	2.60E-03
26-Jan-88	3.50E-02
27-Jan-88	3.53E-02
28-Jan-88	3.40E-03
31-Jan-88	3.22E-02
1-Feb-88	2.50E-02
2-Feb-88	2.52E-03
6-Feb-88	1.03E-03
7-Feb-88	6.20E-04
8-Feb-88	9.31E-04

OCCUPATIONAL RADON PROGENY DATA (WORKING LEVELS)
DAILY AVERAGES (continued)

Date	Conc. (WL)
9-Feb-88	1.41E-04
1-Mar-88	2.41E-03
2-Mar-88	1.80E-03
7-Mar-88	1.87E-03
8-Mar-88	1.65E-03
9-Mar-88	2.50E-04
10-Mar-88	2.92E-04
11-Mar-88	1.17E-04
13-Mar-88	6.21E-04
14-Mar-88	6.01E-04
15-Mar-88	1.12E-03
16-Mar-88	1.33E-03
17-Mar-88	8.14E-04
20-Mar-88	5.18E-04
22-Mar-88	9.37E-04
23-Mar-88	1.25E-03
27-Mar-88	8.13E-04
28-Mar-88	4.38E-04
29-Mar-88	1.09E-03
30-Mar-88	1.28E-03
31-Mar-88	1.31E-03
1-Apr-88	2.45E-03
3-Apr-88	7.61E-04
4-Apr-88	6.87E-04
5-Apr-88	1.30E-03
6-Apr-88	1.27E-03
7-Apr-88	1.41E-03
10-Apr-88	7.86E-04
11-Apr-88	6.04E-04
12-Apr-88	1.10E-03
13-Apr-88	8.59E-04
14-Apr-88	1.00E-03
17-Apr-88	9.06E-04
18-Apr-88	1.11E-03
19-Apr-88	5.53E-04
20-Apr-88	9.10E-04
22-Apr-88	7.23E-04
24-Apr-88	1.27E-03
25-Apr-88	2.06E-03
26-Apr-88	2.59E-03
27-Apr-88	1.25E-03
1-May-88	6.25E-04

APPENDIX 6-B

ENVIRONMENTAL AIR SAMPLES

ENVIRONMENTAL AIR SAMPLES

1.0 GENERAL

This appendix contains the data sets for the environmental air sampling program. Shown below is the a key to identify the types and locations of measurements taken.

AIR SAMPLE ID

L D - A P E - 0 0 0 1

UNIQUE SEQUENTIAL
SAMPLE IDENTIFIER

TYPE OF ENVIRONMENTAL
AIR SAMPLE
APE = LOW FLOW RATE
WLE = WORKING LEVEL

PROJECT SITE
LD = LANSDOWNE, PA

LOCATION CODE
0 1

AIR SAMPLER STATION
1 = CAM STATION # 1
2 = CAM STATION # 2
3 = CAM STATION # 3
4 = CAM STATION # 4

SAMPLER TYPE
0 = ALPHA - 5
1 = AMS - 3

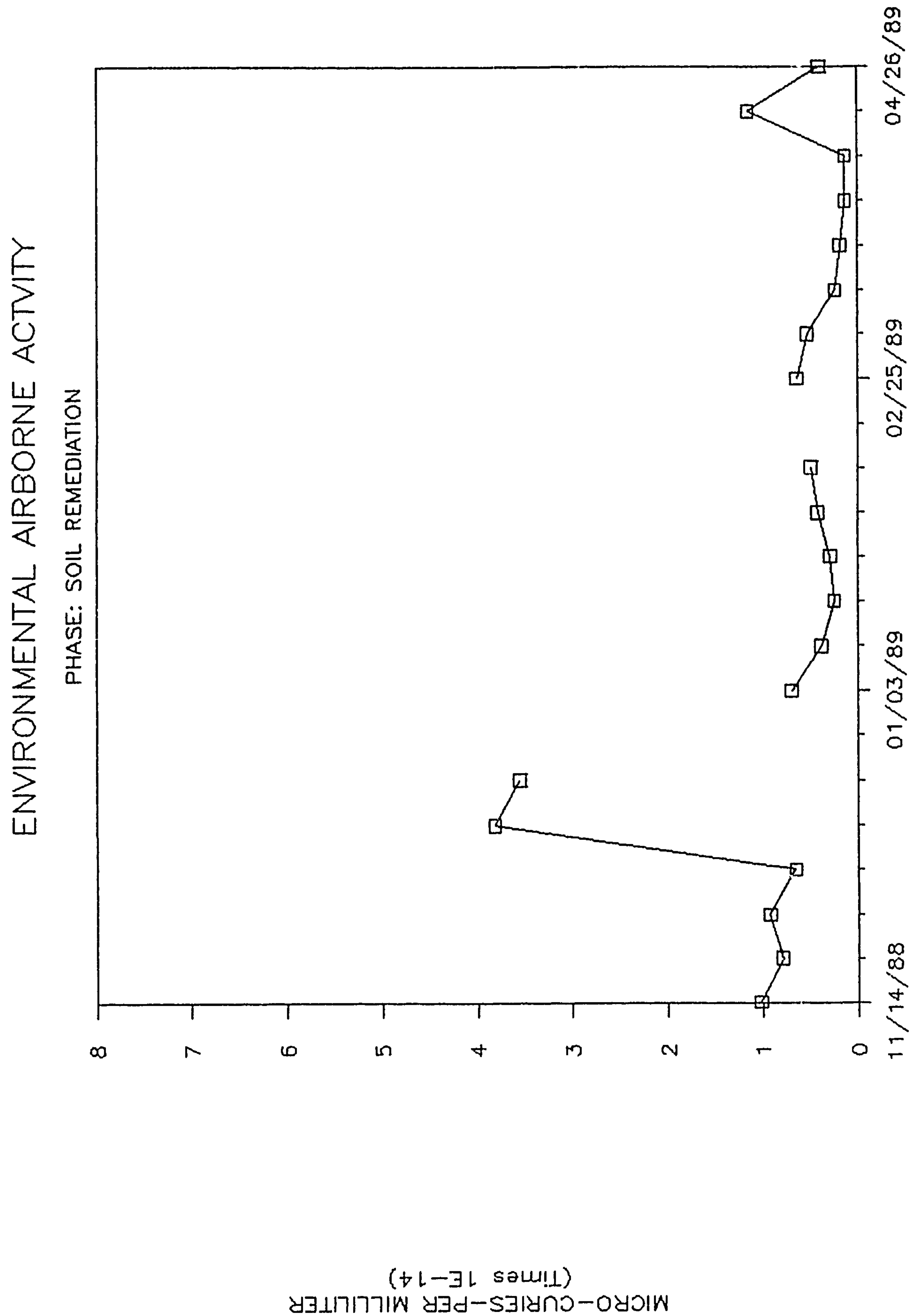


FIGURE 0.1 ENVIRONMENTAL AIRBORNE CONCENTRATIONS

ENVIRONMENTAL AIR SAMPLING DATA FOR CAM STATION #1

Sample ID	Loc	Samp In	Samp Out	Alpha Act. (μCi/ml)
LD-APE-0099	01	14-Nov-88	19-Nov-88	8.70E-15
LD-APE-0100	11	14-Nov-88	19-Nov-88	4.60E-15
LD-APE-0108	01	19-Nov-88	29-Nov-88	6.40E-15
LD-APE-0109	11	19-Nov-88	29-Nov-88	4.60E-15
LD-APE-0116	01	29-Nov-88	3-Dec-88	2.50E-15
LD-APE-0118	11	29-Nov-88	3-Dec-88	6.30E-16
LD-APE-0123	01	3-Dec-88	10-Dec-88	1.49E-15
LD-APE-0124	11	3-Dec-88	10-Dec-88	6.35E-15
LD-APE-0131	01	10-Dec-88	17-Dec-88	1.97E-13
LD-APE-0132	11	10-Dec-88	17-Dec-88	1.45E-14
LD-APE-0139	01	17-Dec-88	22-Dec-88	7.18E-15
LD-APE-0140	11	17-Dec-88	22-Dec-88	6.52E-14
LD-APE-0157	01	3-Jan-88	7-Jan-88	6.50E-16
LD-APE-0158	11	3-Jan-88	7-Jan-88	3.90E-15
LD-APE-0165	01	7-Jan-88	14-Jan-88	5.10E-15
LD-APE-0166	11	7-Jan-88	14-Jan-88	2.10E-15
LD-APE-0173	01	14-Jan-88	21-Jan-88	2.50E-15
LD-APE-0174	11	14-Jan-88	21-Jan-88	3.20E-15
LD-APE-0182	01	21-Jan-88	31-Jan-88	1.30E-15
LD-APE-0183	11	21-Jan-88	31-Jan-88	1.30E-14
LD-APE-0197	11	31-Jan-88	6-Feb-88	2.20E-14
LD-APE-0198	01	31-Jan-88	6-Feb-88	1.52E-15
LD-APE-0201	01	6-Feb-88	12-Feb-88	7.48E-15
LD-APE-0202	11	6-Feb-88	12-Feb-88	3.33E-15
LD-APE-0236	01	25-Feb-88	3-Mar-88	4.24E-15
LD-APE-0237	11	25-Feb-88	3-Mar-88	4.24E-15
LD-APE-0245	01	3-Mar-88	11-Mar-88	2.41E-15
LD-APE-0246	11	3-Mar-88	11-Mar-88	3.84E-15
LD-APE-0253	01	11-Mar-88	18-Mar-88	4.66E-15
LD-APE-0254	11	11-Mar-88	18-Mar-88	<MDA
LD-APE-0261	01	18-Mar-88	27-Mar-88	3.10E-15
LD-APE-0262	11	18-Mar-88	27-Mar-88	8.46E-16
LD-APE-0269	01	27-Mar-88	3-Apr-88	7.42E-16
LD-APE-0270	11	27-Mar-88	3-Apr-88	<MDA
LD-APE-0285	01	10-Apr-88	17-Apr-88	1.92E-15
LD-APE-0286	11	10-Apr-88	17-Apr-88	7.43E-16
LD-APE-0293	01	17-Apr-88	22-Apr-88	3.80E-14
LD-APE-0296	11	17-Apr-88	24-Apr-88	3.10E-15
LD-APE-0294	01	22-Apr-88	24-Apr-88	1.30E-15
LD-APE-0302	01	24-Apr-88	25-Apr-88	<MDA
LD-APE-0303	01	25-Apr-88	26-Apr-88	<MDA
LD-APE-0304	01	26-Apr-88	1-May-88	2.75E-15
LD-APE-0305	11	24-Apr-88	1-May-88	5.46E-15

WEEKLY AVERAGES FOR CAM STATION #1

Start date	Stop date	Average Alpha Activity ($\mu Ci/ml$)
14-Nov-88	19-Nov-88	6.65E-15
19-Nov-88	29-Nov-88	5.50E-15
29-Nov-88	3-Dec-88	1.56E-15
3-Dec-88	10-Dec-88	3.92E-15
10-Dec-88	17-Dec-88	1.06E-13
17-Dec-88	22-Dec-88	3.62E-14
3-Jan-88	7-Jan-88	2.28E-15
7-Jan-88	14-Jan-88	3.60E-15
14-Jan-88	21-Jan-88	2.85E-15
21-Jan-88	31-Jan-88	7.15E-15
31-Jan-88	6-Feb-88	1.18E-14
6-Feb-88	12-Feb-88	5.40E-15
25-Feb-88	3-Mar-88	4.24E-15
3-Mar-88	11-Mar-88	3.12E-15
11-Mar-88	18-Mar-88	2.33E-15
18-Mar-88	27-Mar-88	1.97E-15
27-Mar-88	3-Apr-88	3.71E-16
10-Apr-88	17-Apr-88	1.33E-15
17-Apr-88	22-Apr-88	2.06E-14
22-Apr-88	1-May-88	1.90E-15

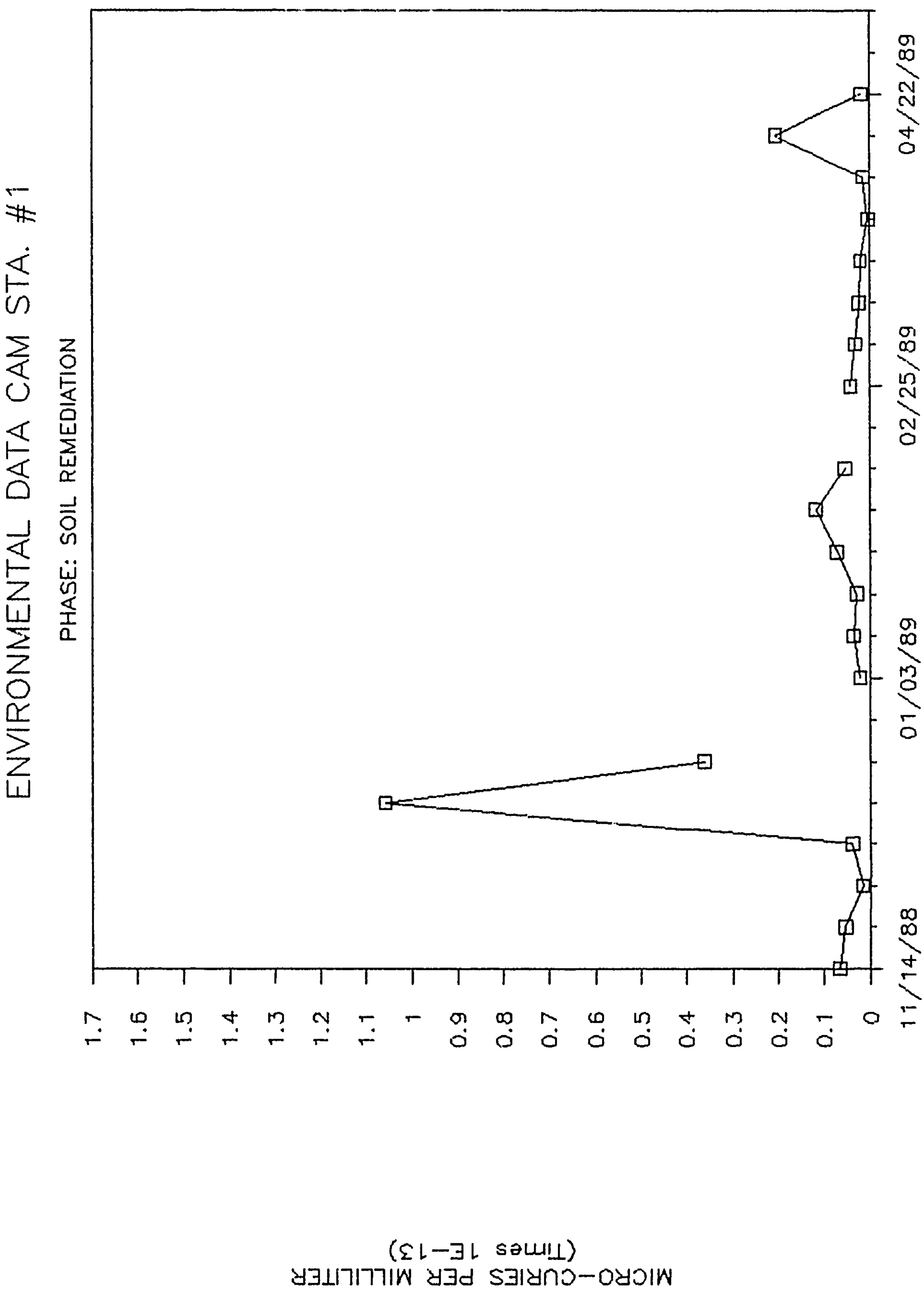


FIGURE 0.2 CAM STATION #1

ENVIRONMENTAL AIR SAMPLING DATA FOR CAM STATION #2

Sample ID	Loc	Samp In	Samp Out	Alpha Act. (μCi/ml)
LD-APE-0101	02	14-Nov-88	19-Nov-88	7.50E-15
LD-APE-0102	12	14-Nov-88	19-Nov-88	1.10E-14
LD-APE-0110	02	19-Nov-88	29-Nov-88	2.30E-14
LD-APE-0111	12	19-Nov-88	29-Nov-88	7.80E-15
LD-APE-0117	02	29-Nov-88	3-Dec-88	1.20E-15
LD-APE-0119	12	29-Nov-88	3-Dec-88	4.10E-14
LD-APE-0125	02	3-Dec-88	10-Dec-88	1.87E-15
LD-APE-0126	12	3-Dec-88	10-Dec-88	1.87E-15
LD-APE-0133	02	10-Dec-88	17-Dec-88	1.63E-14
LD-APE-0134	12	10-Dec-88	17-Dec-88	1.37E-14
LD-APE-0141	02	17-Dec-88	22-Dec-88	6.70E-15
LD-APE-0142	12	17-Dec-88	22-Dec-88	6.00E-15
LD-APE-0159	02	3-Jan-88	7-Jan-88	3.30E-15
LD-APE-0160	12	3-Jan-88	7-Jan-88	1.00E-14
LD-APE-0167	02	7-Jan-88	14-Jan-88	5.10E-15
LD-APE-0168	12	7-Jan-88	14-Jan-88	2.80E-15
LD-APE-0175	02	14-Jan-88	21-Jan-88	1.80E-15
LD-APE-0176	12	14-Jan-88	21-Jan-88	7.00E-16
LD-APE-0184	02	21-Jan-88	31-Jan-88	2.50E-15
LD-APE-0185	12	21-Jan-88	25-Jan-88	6.40E-16
LD-APE-0186	12	25-Jan-88	31-Jan-88	1.70E-15
LD-APE-0195	12	31-Jan-88	6-Feb-88	4.14E-16
LD-APE-0196	02	31-Jan-88	6-Feb-88	3.19E-15
LD-APE-0203	02	6-Feb-88	12-Feb-88	4.77E-15
LD-APE-0204	12	6-Feb-88	12-Feb-88	7.90E-16
LD-APE-0238	02	25-Feb-88	3-Mar-88	8.67E-15
LD-APE-0239	12	25-Feb-88	3-Mar-88	2.83E-15
LD-APE-0247	02	3-Mar-88	11-Mar-88	7.34E-15
LD-APE-0248	12	3-Mar-88	11-Mar-88	6.07E-15
LD-APE-0255	02	11-Mar-88	18-Mar-88	7.78E-16
LD-APE-0256	12	11-Mar-88	18-Mar-88	7.54E-16
LD-APE-0263	02	18-Mar-88	27-Mar-88	<MDA
LD-APE-0264	12	18-Mar-88	27-Mar-88	2.91E-15
LD-APE-0271	02	27-Mar-88	3-Apr-88	3.78E-16
LD-APE-0272	12	27-Mar-88	3-Apr-88	3.78E-16
LD-APE-0287	02	10-Apr-88	17-Apr-88	2.18E-15
LD-APE-0288	12	10-Apr-88	17-Apr-88	<MDA
LD-APE-0295	02	17-Apr-88	24-Apr-88	8.00E-16
LD-APE-0297	12	17-Apr-88	24-Apr-88	3.60E-15
LD-APE-0306	02	24-Apr-88	1-May-88	1.54E-15
LD-APE-0307	12	24-Apr-88	1-May-88	8.27E-15

WEEKLY AVERAGES FOR CAM STATION #2

Start date	Stop date	Average Alpha Activity (μCi/ml)
14-Nov-88	19-Nov-88	9.25E-15
19-Nov-88	29-Nov-88	1.54E-14
29-Nov-88	3-Dec-88	2.11E-14
3-Dec-88	10-Dec-88	1.87E-15
10-Dec-88	17-Dec-88	1.50E-14
17-Dec-88	22-Dec-88	6.35E-15
3-Jan-88	7-Jan-88	6.65E-15
7-Jan-88	14-Jan-88	3.95E-15
14-Jan-88	21-Jan-88	1.25E-15
21-Jan-88	31-Jan-88	1.61E-15
31-Jan-88	6-Feb-88	1.80E-15
6-Feb-88	12-Feb-88	2.78E-15
25-Feb-88	3-Mar-88	5.75E-15
3-Mar-88	11-Mar-88	6.71E-15
11-Mar-88	18-Mar-88	7.66E-16
18-Mar-88	27-Mar-88	1.45E-15
27-Mar-88	3-Apr-88	3.78E-16
10-Apr-88	17-Apr-88	1.09E-15
17-Apr-88	24-Apr-88	2.20E-15
24-Apr-88	1-May-88	4.91E-15

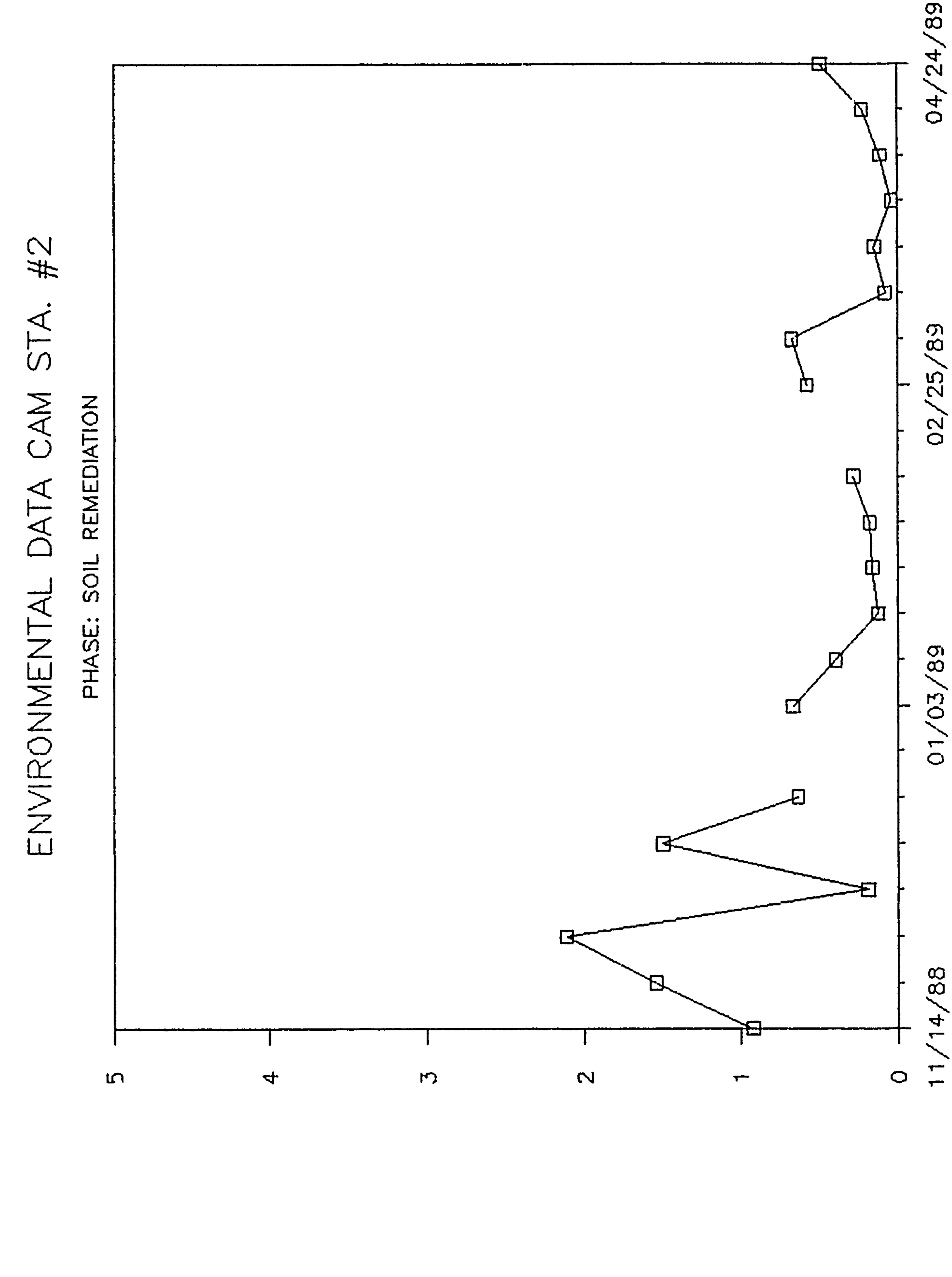


FIGURE 0.3 CAM STATION #2

6-B-240

ENVIRONMENTAL AIR SAMPLING DATA FOR CAM STATION #3

Sample ID	Loc	Samp In	Samp Out	Alpha Act. (μCi/ml)
LD-APE-0103	03	14-Nov-88	19-Nov-88	1.40E-14
LD-APE-0104	13	14-Nov-88	19-Nov-88	1.20E-14
LD-APE-0112	03	19-Nov-88	29-Nov-88	6.50E-15
LD-APE-0113	13	19-Nov-88	29-Nov-88	6.10E-15
LD-APE-0120	03	29-Nov-88	3-Dec-88	5.90E-16
LD-APE-0121	13	29-Nov-88	3-Dec-88	1.88E-15
LD-APE-0127	03	3-Dec-88	10-Dec-88	4.80E-15
LD-APE-0128	13	3-Dec-88	10-Dec-88	7.85E-15
LD-APE-0135	03	10-Dec-88	17-Dec-88	1.92E-14
LD-APE-0136	13	10-Dec-88	17-Dec-88	1.41E-14
LD-APE-0143	03	17-Dec-88	22-Dec-88	6.20E-14
LD-APE-0144	13	17-Dec-88	22-Dec-88	9.30E-15
LD-APE-0161	03	3-Jan-88	7-Jan-88	1.10E-14
LD-APE-0162	13	3-Jan-88	7-Jan-88	9.20E-15
LD-APE-0169	03	7-Jan-88	14-Jan-88	1.00E-15
LD-APE-0170	13	7-Jan-88	14-Jan-88	5.10E-15
LD-APE-0177	03	14-Jan-88	21-Jan-88	1.80E-15
LD-APE-0178	13	14-Jan-88	21-Jan-88	2.50E-15
LD-APE-0187	03	21-Jan-88	31-Jan-88	3.30E-15
LD-APE-0188	13	21-Jan-88	31-Jan-88	2.30E-16
LD-APE-0193	13	31-Jan-88	6-Feb-88	9.22E-16
LD-APE-0194	03	31-Jan-88	6-Feb-88	2.07E-15
LD-APE-0205	03	6-Feb-88	12-Feb-88	7.10E-15
LD-APE-0206	13	6-Feb-88	12-Feb-88	<MDA
LD-APE-0240	03	25-Feb-88	3-Mar-88	1.64E-14
LD-APE-0241	13	25-Feb-88	3-Mar-88	7.30E-15
LD-APE-0249	03	3-Mar-88	11-Mar-88	4.20E-15
LD-APE-0250	13	3-Mar-88	11-Mar-88	3.82E-15
LD-APE-0257	03	11-Mar-88	18-Mar-88	4.15E-15
LD-APE-0258	13	11-Mar-88	18-Mar-88	3.89E-16
LD-APE-0265	03	18-Mar-88	27-Mar-88	4.95E-15
LD-APE-0266	13	18-Mar-88	27-Mar-88	5.82E-16
LD-APE-0273	03	27-Mar-88	3-Apr-88	2.84E-15
LD-APE-0274	13	27-Mar-88	3-Apr-88	2.65E-15
LD-APE-0289	03	10-Apr-88	17-Apr-88	2.22E-15
LD-APE-0290	13	10-Apr-88	17-Apr-88	1.11E-15
LD-APE-0298	03	17-Apr-88	24-Feb-88	2.30E-14
LD-APE-0299	13	17-Apr-88	24-Apr-88	4.70E-15
LD-APE-0308	03	24-Apr-88	1-May-88	3.13E-15
LD-APE-0309	13	24-Apr-88	1-May-88	5.82E-15

WEEKLY AVERAGES FOR CAM STATION #3

Start date	Stop date	Average Alpha Activity (μCi/ml)
14-Nov-88	19-Nov-88	1.30E-14
19-Nov-88	29-Nov-88	6.30E-15
29-Nov-88	3-Dec-88	1.23E-15
3-Dec-88	10-Dec-88	6.32E-15
10-Dec-88	17-Dec-88	1.66E-14
17-Dec-88	22-Dec-88	3.57E-14
3-Jan-88	7-Jan-88	1.01E-14
7-Jan-88	14-Jan-88	3.05E-15
14-Jan-88	21-Jan-88	2.15E-15
21-Jan-88	31-Jan-88	1.77E-15
31-Jan-88	6-Feb-88	1.50E-15
6-Feb-88	12-Feb-88	3.55E-15
25-Feb-88	3-Mar-88	1.19E-14
3-Mar-88	11-Mar-88	4.01E-15
11-Mar-88	18-Mar-88	2.27E-15
18-Mar-88	27-Mar-88	2.77E-15
27-Mar-88	3-Apr-88	2.75E-15
10-Apr-88	17-Apr-88	1.66E-15
17-Apr-88	24-Apr-88	1.39E-14
24-Apr-88	1-May-88	4.47E-15

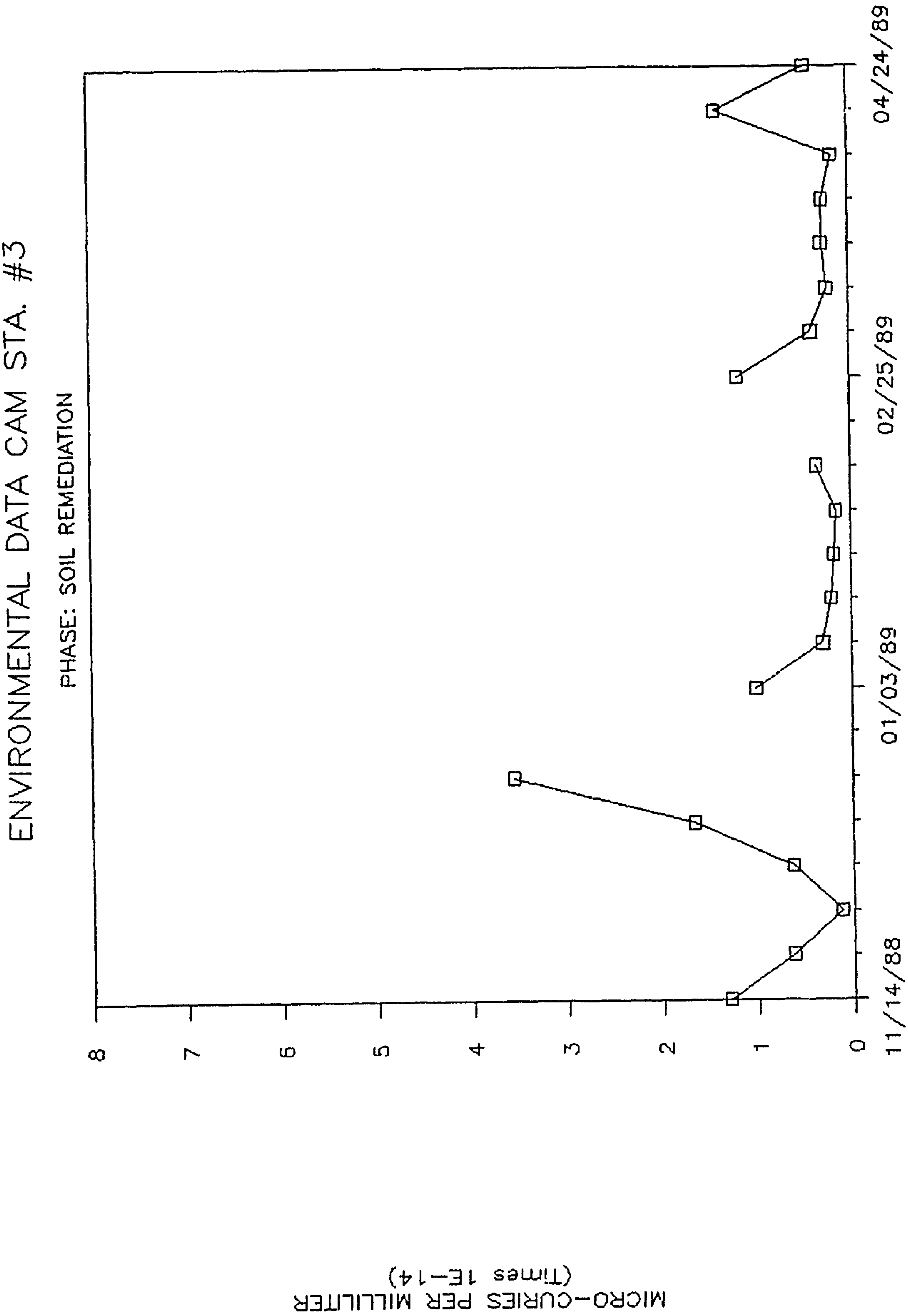


FIGURE 0.4 CAM STATION #3

ENVIRONMENTAL AIR SAMPLING DATA FOR CAM STATION #4

Sample ID	Loc	Samp In	Samp Out	Alpha Act. (μCi/ml)
LD-APE-0105	04	14-Nov-88	19-Nov-88	1.50E-14
LD-APE-0106	14	14-Nov-88	19-Nov-88	9.10E-15
LD-APE-0114	04	19-Nov-88	29-Nov-88	7.50E-15
LD-APE-0115	14	19-Nov-88	29-Nov-88	1.50E-15
LD-APE-0086	04	29-Nov-88	3-Dec-88	2.40E-14
LD-APE-0122	14	29-Nov-88	3-Dec-88	2.35E-15
LD-APE-0129	04	3-Dec-88	10-Dec-88	2.99E-15
LD-APE-0130	14	3-Dec-88	10-Dec-88	2.50E-14
LD-APE-0137	04	10-Dec-88	17-Dec-88	1.55E-14
LD-APE-0138	14	10-Dec-88	17-Dec-88	1.48E-14
LD-APE-0145	04	17-Dec-88	19-Dec-88	3.90E-15
LD-APE-0147	14	17-Dec-88	19-Dec-88	3.80E-14
LD-APE-0148	14	19-Dec-88	22-Dec-88	7.90E-15
LD-APE-0146	04	19-Dec-88	22-Dec-88	1.50E-13
LD-APE-0163	04	3-Jan-88	7-Jan-88	1.50E-14
LD-APE-0164	14	3-Jan-88	7-Jan-88	2.60E-15
LD-APE-0171	04	7-Jan-88	14-Jan-88	4.00E-15
LD-APE-0172	14	7-Jan-88	14-Jan-88	5.50E-15
LD-APE-0179	04	14-Jan-88	21-Jan-88	3.50E-15
LD-APE-0180	14	14-Jan-88	17-Jan-88	5.70E-15
LD-APE-0181	14	17-Jan-88	21-Jan-88	6.20E-16
LD-APE-0189	04	21-Jan-88	31-Jan-88	2.70E-15
LD-APE-0190	14	21-Jan-88	31-Jan-88	7.50E-16
LD-APE-0191	14	31-Jan-88	6-Feb-88	2.30E-15
LD-APE-0192	04	31-Jan-88	6-Feb-88	1.26E-15
LD-APE-0207	04	6-Feb-88	11-Feb-88	9.51E-15
LD-APE-0208	14	6-Feb-88	11-Feb-88	6.34E-15
LD-APE-0242	04	25-Feb-88	3-Mar-88	7.34E-15
LD-APE-0243	14	25-Feb-88	3-Mar-88	<MDA
LD-APE-0251	04	3-Mar-88	11-Mar-88	7.33E-15
LD-APE-0252	14	3-Mar-88	11-Mar-88	7.20E-15
LD-APE-0259	04	11-Mar-88	18-Mar-88	3.89E-15
LD-APE-0260	14	11-Mar-88	18-Mar-88	4.30E-15
LD-APE-0267	04	18-Mar-88	27-Mar-88	1.26E-15
LD-APE-0268	14	18-Mar-88	27-Mar-88	9.41E-16
LD-APE-0275	04	27-Mar-88	3-Apr-88	2.84E-15
LD-APE-0276	14	27-Mar-88	3-Apr-88	7.56E-16
LD-APE-0291	04	10-Apr-88	17-Apr-88	1.85E-15
LD-APE-0292	14	10-Apr-88	17-Apr-88	<MDA
LD-APE-0300	04	17-Apr-88	24-Apr-88	2.30E-14
LD-APE-0301	14	17-Apr-88	24-Apr-88	5.50E-15
LD-APE-0310	04	24-Apr-88	1-May-88	8.17E-15
LD-APE-0311	14	24-Apr-88	1-May-88	5.01E-15

WEEKLY AVERAGES FOR CAM STATION #4

Start date	Stop date	Average Alpha Activity ($\mu Ci/ml$)
14-Nov-88	19-Nov-88	1.20E-14
19-Nov-88	29-Nov-88	4.50E-15
29-Nov-88	3-Dec-88	1.32E-14
3-Dec-88	10-Dec-88	1.40E-14
10-Dec-88	17-Dec-88	1.52E-14
17-Dec-88	19-Dec-88	2.09E-14
19-Dec-88	22-Dec-88	5.00E-14
19-Dec-88	22-Dec-88	7.90E-14
3-Jan-88	7-Jan-88	8.80E-15
7-Jan-88	14-Jan-88	4.75E-15
14-Jan-88	21-Jan-88	3.27E-15
21-Jan-88	31-Jan-88	1.72E-15
31-Jan-88	6-Feb-88	1.78E-15
6-Feb-88	11-Feb-88	7.93E-15
25-Feb-88	3-Mar-88	3.67E-15
3-Mar-88	11-Mar-88	7.26E-15
11-Mar-88	18-Mar-88	4.09E-15
18-Mar-88	27-Mar-88	1.10E-15
27-Mar-88	3-Apr-88	1.80E-15
10-Apr-88	17-Apr-88	9.25E-16
17-Apr-88	24-Apr-88	1.42E-14
24-Apr-88	1-May-88	6.59E-15

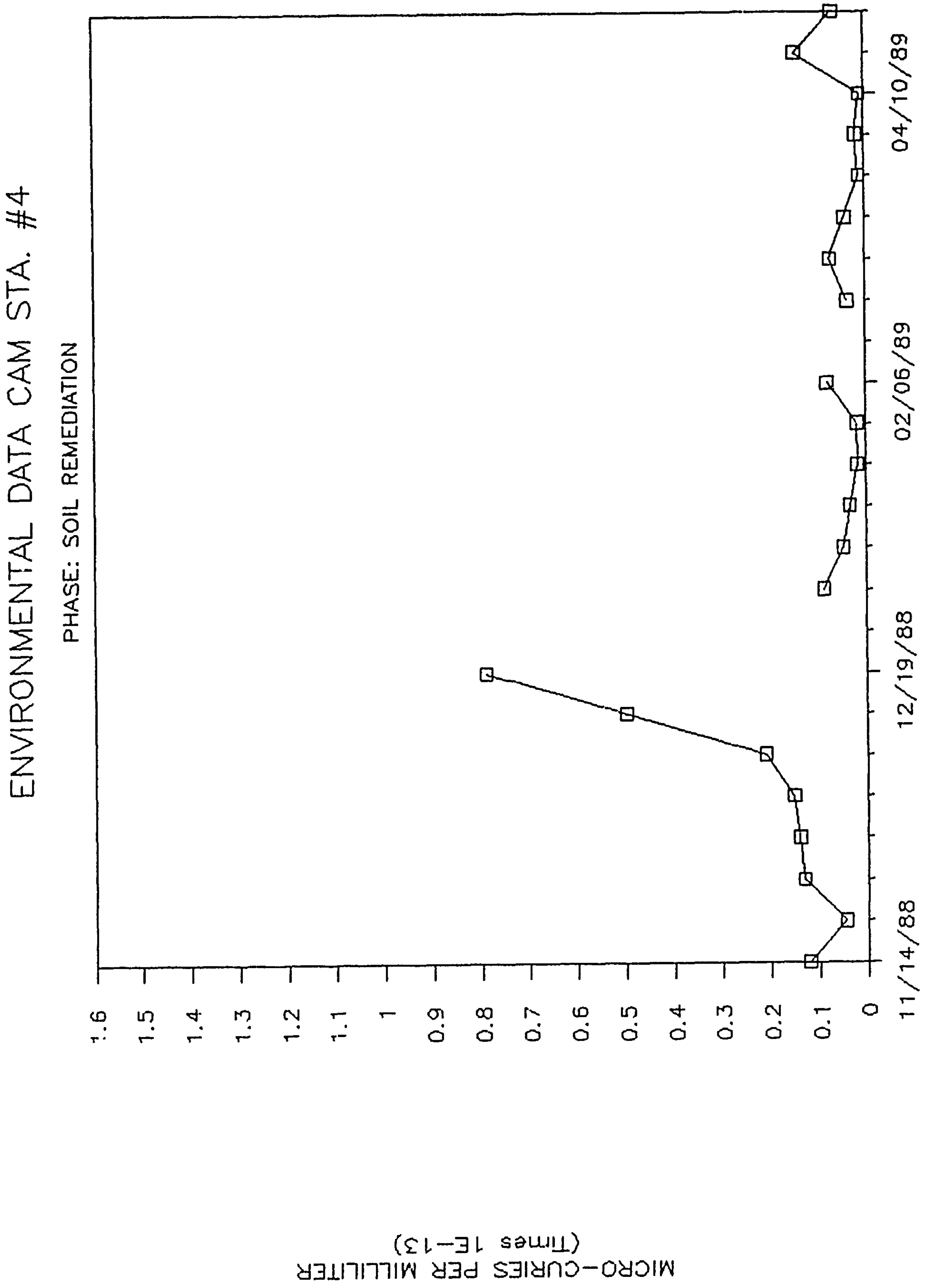


FIGURE 0.5 CAM STATION #4

ENVIRONMENTAL RADON PROGENY DATA (WORKING LEVELS)

Sample ID	Date	Time	Conc. (WL)
LD-WLE-090	19-Nov-88	730	2.73E-03
LD-WLE-091	21-Nov-88	831	2.51E-03
LD-WLE-092	21-Nov-88	840	1.96E-03
LD-WLE-093	22-Nov-88	1011	1.98E-03
LD-WLE-094	22-Nov-88	1419	3.34E-03
LD-WLE-095	22-Nov-88	1510	1.75E-03
LD-WLE-096	23-Nov-88	813	3.18E-03
LD-WLE-097	23-Nov-88	1034	5.84E-04
LD-WLE-098	29-Nov-88	712	1.64E-03
LD-WLE-099	29-Nov-88	830	2.04E-03
LD-WLE-0101	30-Nov-88	714	3.08E-03
LD-WLE-0103	1-Dec-88	802	3.72E-03
LD-WLE-0106	2-Dec-88	749	1.93E-03
LD-WLE-0108	3-Dec-88	830	6.04E-03
LD-WLE-0110	3-Dec-88	1605	6.37E-04
LD-WLE-0111	5-Dec-88	805	1.91E-03
LD-WLE-0114	6-Dec-88	726	1.11E-03
LD-WLE-0116	7-Dec-88	720	3.40E-03
LD-WLE-0119	8-Dec-88	745	3.06E-04
LD-WLE-0120	8-Dec-88	1535	9.40E-04
LD-WLE-0121	9-Dec-88	820	6.75E-05
LD-WLE-0123	9-Dec-88	1525	2.10E-04
LD-WLE-0126	12-Dec-88	725	6.82E-04
LD-WLE-0127	12-Dec-88	900	5.50E-04
LD-WLE-0129	12-Dec-88	1525	3.95E-04
LD-WLE-0130	13-Dec-88	710	5.47E-04
LD-WLE-0132	13-Dec-88	1528	2.36E-04
LD-WLE-0134	14-Dec-88	718	3.14E-03
LD-WLE-0138	15-Dec-88	1509	3.83E-04
LD-WLE-0139	16-Dec-88	815	1.93E-04
LD-WLE-0141	17-Dec-88	720	1.14E-03
LD-WLE-0142	19-Dec-88	710	1.53E-03
LD-WLE-0145	20-Dec-88	735	3.43E-03
LD-WLE-0147	20-Dec-88	1535	2.36E-04
LD-WLE-0148	21-Dec-88	710	1.24E-03
LD-WLE-0150	3-Jan-89	840	1.29E-03
LD-WLE-0152	4-Jan-89	730	8.20E-04
LD-WLE-0154	5-Jan-89	1245	4.32E-04
LD-WLE-0156	5-Jan-89	1532	6.56E-04
LD-WLE-0158	6-Jan-89	725	5.12E-04
LD-WLE-0159	6-Jan-89	1520	2.06E-04
LD-WLE-0160	7-Jan-89	740	3.04E-04
LD-WLE-0162	7-Jan-89	1511	7.67E-04
LD-WLE-0163	9-Jan-89	725	4.96E-04
LD-WLE-0165	9-Jan-89	1515	6.57E-04
LD-WLE-0167	10-Jan-89	732	1.15E-03
LD-WLE-0168	11-Jan-89	654	1.07E-03
LD-WLE-0170	11-Jan-89	1505	5.08E-04

Sample ID	Date	Time	Conc. (WL)
LD-WLE-0172	13-Jan-89	802	1.08E-03
LD-WLE-0173	13-Jan-89	1416	2.24E-04
LD-WLE-0175	14-Jan-89	657	2.07E-03
LD-WLE-0177	14-Jan-89	1503	6.60E-04
LD-WLE-0179	16-Jan-89	710	1.25E-03
LD-WLE-0181	16-Jan-89	1426	5.30E-04
LD-WLE-0184	17-Jan-89	708	6.70E-04
LD-WLE-0185	17-Jan-89	1421	9.30E-04
LD-WLE-0188	18-Jan-89	750	4.90E-03
LD-WLE-0189	19-Jan-89	649	4.60E-03
LD-WLE-0191	19-Jan-89	1310	1.60E-03
LD-WLE-0193	20-Jan-89	745	2.00E-03
LD-WLE-0195	20-Jan-89	1553	9.00E-04
LD-WLE-0197	21-Jan-89	810	7.70E-04
LD-WLE-0198	21-Jan-89	1522	1.10E-04
LD-WLE-0199	23-Jan-89	722	1.70E-03
LD-WLE-0202	23-Jan-89	1400	1.10E-03
LD-WLE-0204	24-Jan-89	742	6.40E-03
LD-WLE-0205	24-Jan-89	1251	1.10E-03
LD-WLE-0208	25-Jan-89	737	7.10E-04
LD-WLE-0213	25-Jan-89	1310	2.70E-04
LD-WLE-0217	26-Jan-89	828	4.30E-04
LD-WLE-0220	27-Jan-89	728	6.80E-04
LD-WLE-0224	27-Jan-89	1522	3.70E-04
LD-WLE-0226	28-Jan-89	735	1.30E-03
LD-WLE-0227	30-Jan-89	751	1.80E-03
LD-WLE-0229	31-Jan-89	743	1.20E-03
LD-WLE-0232	31-Jan-89	1548	1.40E-03
LD-WLE-0233	1-Feb-89	730	1.10E-03
LD-WLE-0235	1-Feb-89	1245	8.70E-04
LD-WLE-0237	2-Feb-89	720	1.20E-03
LD-WLE-0239	2-Feb-89	1517	1.00E-03
LD-WLE-0241	6-Feb-89	738	2.30E-04
LD-WLE-0243	6-Feb-89	1406	2.50E-03
LD-WLE-0245	7-Feb-89	827	1.00E-03
LD-WLE-0247	7-Feb-89	1530	6.80E-04
LD-WLE-0250	8-Feb-89	954	6.21E-04
LD-WLE-0251	8-Feb-89	1414	3.39E-04
LD-WLE-0254	9-Feb-89	947	9.14E-04
LD-WLE-0255	9-Feb-89	1322	3.95E-04
LD-WLE-0338	13-Mar-89	1330	1.18E-03
LD-WLE-0342	14-Mar-89	800	4.38E-04
LD-WLE-0346	15-Mar-89	830	8.13E-04
LD-WLE-0344	15-Mar-89	1300	9.38E-04
LD-WLE-0349	16-Mar-89	830	7.24E-04
LD-WLE-0351	16-Mar-89	1501	8.45E-04
LD-WLE-0353	17-Mar-89	840	8.13E-04
LD-WLE-0355	18-Mar-89	1430	1.06E-03
LD-WLE-0356	20-Mar-89	829	2.59E-04
LD-WLE-0359	20-Mar-89	1440	5.19E-04

Sample ID	Date	Time	Conc. (WL)
LD-WLE-0370	27-Mar-89	910	8.75E-04
LD-WLE-0371	27-Mar-89	1501	1.38E-03
LD-WLE-0374	28-Mar-89	830	6.88E-04
LD-WLE-0376	28-Mar-89	1515	9.38E-04
LD-WLE-0377	29-Mar-89	912	9.66E-04
LD-WLE-0379	29-Mar-89	1545	7.24E-03
LD-WLE-0386	31-Mar-89	1530	6.64E-04
LD-WLE-0422	14-Apr-89	1110	1.00E-03
LD-WLE-0444	22-Apr-89	715	1.00E-03
LD-WLE-0441	22-Apr-89	855	7.48E-04
LD-WLE-0443	22-Apr-89	1420	2.34E-04
LD-WLE-0447	22-Apr-89	1515	1.12E-03
LD-WLE-0448	24-Apr-89	710	1.69E-03
LD-WLE-0452	25-Apr-89	815	2.12E-03
LD-WLE-0454	25-Apr-89	1505	4.72E-04
LD-WLE-0455	26-Apr-89	720	5.92E-03
LD-WLE-0460	27-Apr-89	710	2.50E-03
LD-WLE-0461	27-Apr-89	1515	1.20E-03

ENVIRONMENTAL RADON PROGENY DATA (WORKING LEVELS)

DAILY AVERAGES

Date	Conc. (WL)
19-Nov-88	2.73E-03
21-Nov-88	2.24E-03
22-Nov-88	2.36E-03
23-Nov-88	5.84E-04
29-Nov-88	1.84E-03
30-Nov-88	3.08E-03
1-Dec-88	3.72E-03
2-Dec-88	1.93E-03
3-Dec-88	3.34E-03
5-Dec-88	1.91E-03
6-Dec-88	1.11E-03
7-Dec-88	3.40E-03
8-Dec-88	6.23E-04
9-Dec-88	1.39E-04
12-Dec-88	5.42E-04
13-Dec-88	3.92E-04
14-Dec-88	3.14E-03
15-Dec-88	3.83E-04
16-Dec-88	1.93E-04
17-Dec-88	1.14E-03
19-Dec-88	1.53E-03
20-Dec-88	1.83E-03
21-Dec-88	1.24E-03
3-Jan-89	1.29E-03
4-Jan-89	8.20E-04
5-Jan-89	5.44E-04
6-Jan-89	3.59E-04
7-Jan-89	5.36E-04
9-Jan-89	5.77E-04
10-Jan-89	1.15E-03
11-Jan-89	7.89E-04
13-Jan-89	6.52E-04
14-Jan-89	1.37E-03
16-Jan-89	8.90E-04
17-Jan-89	8.00E-04
18-Jan-89	4.90E-03
19-Jan-89	3.10E-03
20-Jan-89	1.45E-03
21-Jan-89	4.40E-04
23-Jan-89	1.40E-03
24-Jan-89	3.75E-03
25-Jan-89	4.90E-04
26-Jan-89	4.30E-04
27-Jan-89	5.25E-04
28-Jan-89	1.30E-03
30-Jan-89	1.80E-03

DAILY AVERAGES

Date	Conc. (WL)
31-Jan-89	1.30E-03
1-Feb-89	9.85E-04
2-Feb-89	1.10E-03
6-Feb-89	1.37E-03
7-Feb-89	8.40E-04
8-Feb-89	4.80E-04
9-Feb-89	6.54E-04
13-Mar-89	1.18E-03
14-Mar-89	4.38E-04
15-Mar-89	8.75E-04
16-Mar-89	7.84E-04
17-Mar-89	8.13E-04
18-Mar-89	1.06E-03
20-Mar-89	3.89E-04
27-Mar-89	1.13E-03
28-Mar-89	8.13E-04
29-Mar-89	4.10E-03
31-Mar-89	6.64E-04
14-Apr-89	1.00E-03
22-Apr-89	7.76E-04
24-Apr-89	1.69E-03
25-Apr-89	1.30E-03
26-Apr-89	5.92E-03
27-Apr-89	1.85E-03

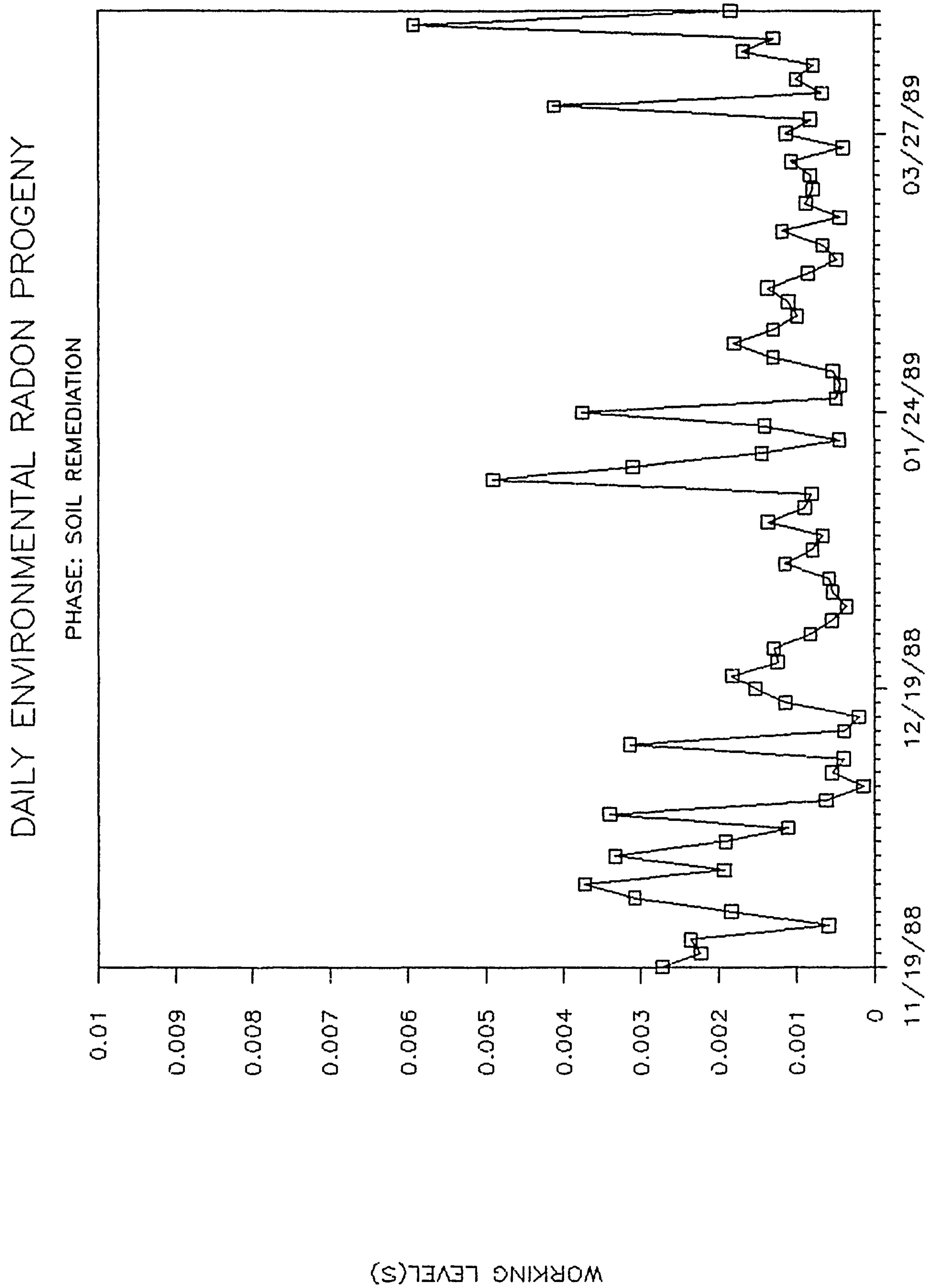


FIGURE 0.6 DAILY ENVIRONMENTAL WL

APPENDIX 6-C

PRE AND POST REMEDIAL GAMMA SOIL SURVEYS

APPENDIX 6-C

PRE AND POST REMEDIAL GAMMA SURVEYS

GRID BLOCK IDENTIFIER	PRE-REMEDIAL AVG. CPTM	POST-REMEDIAL AVG. CPTM
0+05,05L (A-1)	11070	1650
0+05,15L (A-2)	3626	1971
0+05,25L (A-3)	10318	1531
0+05,35L (A-4)	15764	1632
0+05,45L (A-5)	15354	1770
0+05,55L (A-6)	21644	1924
0+05,65L (A-7)	28977	1891
0+05,75L (A-8)	43702	1660
0+05,85L (A-9)	48876	1994
0+05,95L (A-10)	7270	1768
0+05,105L (A-11)	4840	1618
0+05,115L (A-12)	4940	2622
0+05,125L (A-13)	7605	2624
0+05,135L (A-14)	1469	2486
0+05,145L (A-15)	2920	2619
0+15,05L (B-1)	2500	1620
0+15,15L (B-2)	6000	1850
0+15,25L (B-3)	9509	1576
0+15,35L (B-4)	12431	1610
0+15,45L (B-5)	9241	1975
0+15,55L (B-6)	51136	2172
0+15,65L (B-7)	32660	1694
0+15,75L (B-8)	56679	2240
0+15,85L (B-9)	58141	1909
0+15,95L (B-10)	5400	1792
0+15,105L (B-11)	4321	1778
0+15,115L (B-12)	3400	2622
0+15,125L (B-13)	2307	2539
0+15,135L (B-14)	2826	2645
0+15,145L (B-15)	2896	2804
0+25,05L (C-1)	21600	1704
0+25,15L (C-2)	14224	1840
0+25,25L (C-3)	31088	1556
0+25,35L (C-4)	5884	1650
0+25,45L (C-5)	7335	1913
0+25,55L (C-6)	30426	1635
0+25,65L (C-7)	40880	1889
0+25,75L (C-8)	55022	1890
0+25,85L (C-9)	47087	1757
0+25,95L (C-10)	5184	1824
0+25,105L (C-11)	4280	1997
25,115L (C-12)	2474	2755
25,125L (C-13)	2628	2758

GRID BLOCK IDENTIFIER	PRE-REMEDIAL AVG. CPTM	POST-REMEDIAL AVG. CPTM
0+25,135L (C-14)	2459	3096
0+25,145L (C-15)	3008	3001
0+35,05L (D-1)	*	1675
0+35,15L (D-2)	*	1701
0+35,25L (D-3)	31088	1580
0+35,35L (D-4)	5420	1528
0+35,45L (D-5)	3112	1576
0+35,55L (D-6)	9907	1829
0+35,65L (D-7)	79360	1722
0+35,75L (D-8)	34876	1890
0+35,85L (D-9)	9330	1789
0+35,95L (D-10)	1849	1521
0+35,105L (D-11)	3553	1746
0+35,115L (D-12)	2577	2688
0+35,125L (D-13)	2336	2709
0+35,135L (D-14)	2324	3064
0+35,145L (D-15)	2662	3090
0+45,05L (E-1)	6600	1782
0+45,15L (E-2)	5700	1760
0+45,25L (E-3)	16430	1680
0+45.35L (E-4)	30427	1540
0+45,45L (E-5)	**	1560
0+45,55L (E-6)	**	1814
0+45,65L (E-7)	13631	1720
0+45,75L (E-8)	***	1600
0+45,85L (E-9)	10988	1910
0+45,95L (E-10)	11533	1504
0+45,105L (E-11)	6075	1619
0+45,115L (E-12)	2812	1728
0+45,125L (E-13)	2303	1697
0+45,135L (E-14)	2463	2787
0+45,145L (E-15)	2263	2881
0+55,05L (F-1)	3754	1716
0+55,15L (F-2)	5400	1718
0+55,25L (F-3)	13949	1800
0+55,35L (F-4)	21083	1665
0+55,45L (F-5	***	1453
0+55,55L (F-6	***	1694
0+55,65L (F-7)	***	1699
0+55,75L (F-8)	***	1590
0+55,85L (F-9)	***	1613
0+55,95L (F-10	***	1697

* grid obstructed by LSA box
** grid obstructed by LSA containment
*** grid obstructed by 105/107 east stratford structure

GRID BLOCK IDENTIFIER	PRE-REMEDIAL AVG. CPTM	POST-REMEDIAL AVG. CPTM
0+55,105L (F-11)	2983	1488
0+55,115L (F-12)	2280	1517
0+55,125L (F-13)	2465	1748
0+55,135L (F-14)	2973	1680
0+55,145L (F-15)	2149	1759
0+65,05L (G-1)	5457	1732
0+65,15L (G-2)	6439	1679
0+65,25L (G-3)	10362	1670
0+65,35L (G-4)	10181	1840
0+65,45L (G-5)	2143	1548
0+65,55L (G-6)	***	1801
0+65,65L (G-7)	2680	1678
0+65,75L (G-8)	2851	1460
0+65,85L (G-9)	4338	1482
0+65,95L (G-10)	4009	1636
0+65,105L (G-11)	3158	1671
0+65,115L (G-12)	2100	1611
0+65,125L (G-13)	2466	1794
0+65,135L (G-14)	2220	1853
0+65,145L (G-15)	1973	1748
0+75,05L (H-1)	3570	1628
0+75,15L (H-2)	5404	1790
0+75,25L (H-3)	8800	1700
0+75,35L (H-4)	9530	1950
0+75,45L (H-5)	3050	1502
0+75,55L (H-6)	***	1676
0+75,65L (H-7)	8560	1513
0+75,75L (H-8)	3780	1590
0+75,85L (H-9)	4332	1481
0+75,95L (H-10)	2070	1553
0+75,105L (H-11)	2659	1762
0+75,115L (H-12)	2006	1587
0+75,125L (H-13)	2195	1870
0+75,135L (H-14)	2076	1977
0+75,145L (H-15)	1847	1719
0+85,05L (J-1)	1936	1633
0+85,15L (J-2)	5130	1700
0+85,25L (J-3)	10000	1690
0+85,35L (J-4)	7990	1867
0+85,45L (J-5)	3080	1632
0+85,55L (J-6)	***	1695
0+85,65L (J-7)	***	1503
0+85,75L (J-8)	***	1780
0+85,85L (J-9)	***	1501

*** grid obstructed by 105/107 east stratford structure

GRID BLOCK IDENTIFIER	PRE-REMEDIAL AVG. CPTM	POST-REMEDIAL AVG. CPTM
0+85,95L (J-10)	1628	1758
0+85,105L (J-11)	2489	1631
0+85,115L (J-12)	2135	1551
0+85,125L (J-13)	1906	1862
0+85,135L (J-14)	2008	1937
0+85L,145L (J-15)	1904	1760
0+95,05L (K-1)	2000	1636
0+95,15L (K-2)	2800	1722
0+95,25L (k-3)	5180	1770
0+95,35L (K-4)	11200	2070
0+95,45L (K-5)	6030	1630
0+95,55L (K-6)	***	1619
0+95,65L (K-7)	***	1603
0+95,75L (K-8)	***	1710
0+95,85L (K-9)	***	1549
0+95,95L (K-10)	1940	1789
0+95,105L (K-11)	3099	1758
0+95,115L (K-12)	2224	1610
0+95,125L (K-13)	1866	1998
0+95,135L (K-14)	1968	1942
0+95,145L (K-15)	2031	1759
1+05,05L (L-1)	*	1669
1+05,15L (L-2)	*	1666
1+05,25L (L-3)	4900	1750
1+05,35L (L-4)	11200	1827
1+05,45L (L-5)	29900	1900
1+05,55L (L-6)	27046	1714
1+05,65L (L-7)	9396	1718
1+05,75L (L-8)	34206	1569
1+05,85L (L-9)	18484	1725
1+05,95L (L-10)	14500	1560
1+05,105L (L-11)	14841	1508
1+05,115L (L-12)	11728	1673
1+05,125L (L-13)	9107	1951
1+05,135L (L-14)	9263	1726
1+05,145L (L-15)	9266	1743
1+15,05L (M-1)	*	1661
1+15,15L (M-2)	*	1599
1+15,25L (M-3)	4150	1690
1+15,35L (M-4)	6400	1706
1+15,45L (M-5)	15200	2300
1+15,55L (M-6)	31994	1698
1+15,65L (M-7)	16866	2007

* grid obstructed by LSA box
*** grid obstructed by 105/107 east stratford structure

GRID BLOCK IDENTIFIER	PRE-REMEDIAL AVG. CPTM	POST-REMEDIAL AVG. CPTM
1+15,75L (M-8)	3968	1559
1+15,85L (M-9)	2823	1630
1+15,95L (M-10)	2337	1513
1+15,105L (M-11)	2374	1680
1+15,115L (M-12)	2295	1481
1+15,125L (M-13	1819	1722
1+15,135L (M-14)	1808	1660
1+15,145L (M-15)	1663	1613
1+25,05L (N-1)	*	1595
1+25,15L (N-2)	*	1750
1+25,25L (N-3)	2660	1700
1+25,35L (N-4)	3548	1579
1+25,45L (N-5)	12500	2210
1+25,55L (N-6)	8843	1787
1+25,65L (N-7)	16327	1666
1+25,75L (N-8)	3464	1679
1+25,85L (N-9)	2711	1743
1+25,95L (N-10)	2321	1582
1+25,105L (N-11)	2235	1620
1+25,115L (N-12)	1917	1780
1+25,125L (N-13)	1799	1777
1+25,135L (N-14)	1775	1653
1+25,145L (N-15)	1743	1528
1+35,05L (P-1)	1700	1589
1+35,15L (P-2)	2240	1599
1+35,25L (P-3)	2291	1600
1+35,35L (P-4)	2578	1697
1+35,45L (P-5)	4500	1941
1+35,55L (P-6)	8602	1684
1+35,65L (P-7)	3365	1809
1+35,75L (P-8)	4270	1611
1+35,85L (P-9)	2660	1822
1+35,95L (P-10)	2353	1520
1+35,105L (P-11)	2121	1780
1+35,115L (P-12)	1760	1640
1+35,125L (P-13)	1729	1853
1+35,135L (P-14)	1717	1626
1+35,145L (P-15)	1554	1542
1+45,05L (R-1)	1810	1544
1+45,15L (R-2)	2491	1455
1+45,25L (R-3)	2250	1415
1+45,35L (R-4)	2100	1713
1+45,45L (R-5)	7500	1940
1+45,55L (R-6)	3722	1556

* grid obstructed by LSA box

GRID BLOCK IDENTIFIER	PRE-REMEDIAL AVG. CPTM	POST-REMEDIAL AVG. CPTM
1+45,65L (R-7)	3451	1695
1+45,75L (R-8)	6258	1605
1+45,85L (R-9)	3877	1910
1+45,95L (R-10)	2321	1730
1+45,105L (R-11)	1979	1700
1+45,115L (R-12)	1669	1780
1+45,125L (R-13)	1586	1753
1+45,135L (R-14)	1605	1550
1+45,145L (R-15)	1640	1498
0-5,05L (CA-1)	2090	1656
0-5,15L (CA-2)	2340	1547
0-5,25L (CA-3)	3300	1528
0-5,35L (CA-4)	4330	1645
0-5,45L (CA-5)	3780	1559
0-5,55L (CA-6)	3835	1644
0-5,65L (CA-7)	3370	1644
0-5,75L (CA-8)	3200	1676
0-5,85L (CA-9)	3097	1697
0-5,95L (CA-10)	3491	3078
0-5,105L (CA-11)	2339	2796
0-15,05L (CB-1)	2150	1682
0-15,15L (CB-2)	****	1552
0-15,25L (CB-3)	2430	1547
0-15,35L (CB-4)	2300	1640
0-15,45L (CB-5)	2700	1479
0-15,55L (CB-6)	2459	1608
0-15,65L (CB-7)	2462	1575
0-15,75L (CB-8)	2321	1621
0-15,85L (CB-9)	1984	1555
0-15,95L (CB-10)	2874	2684
0-15,105L (CB-11)	2154	2673
0-05,115L (CB-12)	107 garage	2626
0-25,05L (CC-1)	NOT ACQUIRED	1545
0-25,15L (CC-2)	NOT ACQUIRED	1438
0-25,25L (CC-3)	NOT ACQUIRED	1565
0-25,35L (CC-4)	2002	1579
0-25,45L (CC-5)	2300	1619
0-25,55L (CC-6)	2212	1522
0-25,65L (CC-7)	1994	1591
0-25,75L (CC-8)	1941	1622
0-25,85L (CC-9)	1847	1701
0-25,95L (CC-10)	2020	NON-EXCAVATED
0-25,105L (CC-11)	2300	NON-EXCAVATED

**** grid obstructed by Townsend garage

GRID BLOCK IDENTIFIER	PRE-REMEDIAL AVG. CPTM	POST-REMEDIAL AVG. CPTM
0-35,05L (CD-1)	NOT ACQUIRED	1435
0-35,15L (CD-2)	NOT ACQUIRED	1407
0-35,25L (CD-3)	NOT ACQUIRED	2017
0-35,45L (CD-4)	1590	2507
0-35,55L (CD-5)	1900	NON-EXCAVATED
0-35,65L (CD-6)	1721	NON-EXCAVATED
0-35,75L (CD-7)	1877	NON-EXCAVATED
0-35,85L (CD-8)	1502	NON-EXCAVATED
0-35,95L (CD-9)	1915	NON-EXCAVATED
0-35,105L (CD-10)	1800	NON-EXCAVATED
0-35,115L (CD-11)	1802	NON-EXCAVATED
0-45,45L (CE-4)	1420	NON-EXCAVATED
0-45,55L (CE-5)	1526	NON-EXCAVATED
0-45,65L (CE-6)	1251	NON-EXCAVATED
0-45,75L(CE-7)	1139	NON-EXCAVATED
0-45,85L (CE-8)	1258	NON-EXCAVATED
0-45,95L (CE-9)	1746	NON-EXCAVATED
0-45,105L (CE-10)	1751	NON-EXCAVATED
0-45,115L (CE-11)	1574	NON-EXCAVATED
0-05,125L (GA-1)	1723	2448
0-05,135L (GA-2)	1447	2598
0-05,145L (GA-3)	2368	2861
0-05,155L (GA-4)	1878	2761
0-05,165L (GA-5)	1398	2678
0-05,175L (GA-6)	1485	2869
0-05,185L (GA-7)	1558	2998
0-05,195L (GA-8)	NOT ACQUIRED	3201
0-15,125L (GB-1)	2082	2783
0-15,135L (GB-2)	1830	2593
0-15,145L (GB-3)	1742	2832
0-15,155L (GB-4)	1685	2862
0-15,165L (GB-5)	1606	2529
0-15,175L (GB-6)	1476	2437
0-15,185L (GB-7)	1551	2332
0-15,195L (GB-8)	NOT ACQUIRED	2508
0-25,125L (GC-1)	1235	NON-EXCAVATED
0-25,135L (GC-2)	1762	NON-EXCAVATED
0-25,145L (GC-3)	1700	NON-EXCAVATED
0-25,155L (GC-4)	1530	NON-EXCAVATED
0-25,165L (GC-5)	1535	NON-EXCAVATED
0-25,175L (GC-6)	1545	NON-EXCAVATED
0-35,125L (GD-1)	1862	NON-EXCAVATED
0+05,155L (KA-1)	1825	2783

GRID BLOCK IDENTIFIER	PRE-REMEDIAL AVG. CPTM	POST-REMEDIAL AVG. CPTM
0+05,165L (KA-2)	1876	2632
0+05,175L (KA-3)	2048	1573
0+05,185L (KA-4)	1724	1607
0+05,195L (KA-5)	BURIED DEPOSIT	1587
0+15,155L (KB-1)	1958	2832
0+15,165L (KB-2)	1850	2774
0+15,175L (KB-3)	1812	1562
0+15,185L (KB-4)	1724	1532
0+15,195L (KB-5)	NOT ACQUIRED	1516
0+25,155L (KC-1)	1994	2691
0+25,165L (KC-2)	1707	2596
0+25,175L (KC-3)	1676	1601
0+25,185L (KC-4)	8287	1530
0+25,195L (KC-5)	BURIED DEPOSIT	1534
0+35,155L (KD-1)	1858	2821
0+35,165L (KD-2)	1787	2647
0+35,175L (KD-3)	1635	1780
0+35,185L (KD-4)	BURIED DEPOSIT	1530
0+35,195L (KD-5)	BURIED DEPOSIT	1506
0+45,155L (KE-1)	1891	3008
0+45,165L (KE-2)	1782	1701
0+45,175L (KE-3)	1725	1605
0+45,185L (KE-4)	BURIED DEPOSIT	1519
0+45,195L (KE-5)	BURIED DEPOSIT	1527
0+55,155L (KF-1)	1869	1964
0+55,165L (KF-2)	1627	1744
0+55,175L (KF-3)	1946	1573
0+55,185L (KF-4)	BURIED DEPOSIT	1609
0+55,195L (KF-5)	BURIED DEPOSIT	1476
0+65,155L (KG-1)	1816	1978
0+65,165L (KG-2)	1900	1493
0+65,175L (KG-3)	1680	NON-EXCAVATED
0+75,155L (KH-1)	1889	1996
0+75,165L (KH-2)	1924	1875
0+85,155L (KJ-1)	2028	1840
0+85,165L (KJ-2)	*	1902
0+95,155L (KK-1)	*	1730
0+95,165L (KK-2)	*	1944

* grid obstructed by LSA box

GRID BLOCK IDENTIFIER	PRE-REMEDIAL AVG. CPTM	POST-REMEDIAL AVG. CPTM
1+05,155L (KL-1)	*	1742
1+05,165L (KL-2)	*	1660
1+15,155L (KM-1)	*	1917
1+15,165L (KM-2)	*	1754
1+25,155L (KN-1)	*	1778
1+25,165L (KN-2)	*	1444
1+35,155L (KP-1)	*	1557
1+35,165L (KP-2)	*	1419
1+45,155L (KR-1)	*	1480

* grid obstructed by LSA box

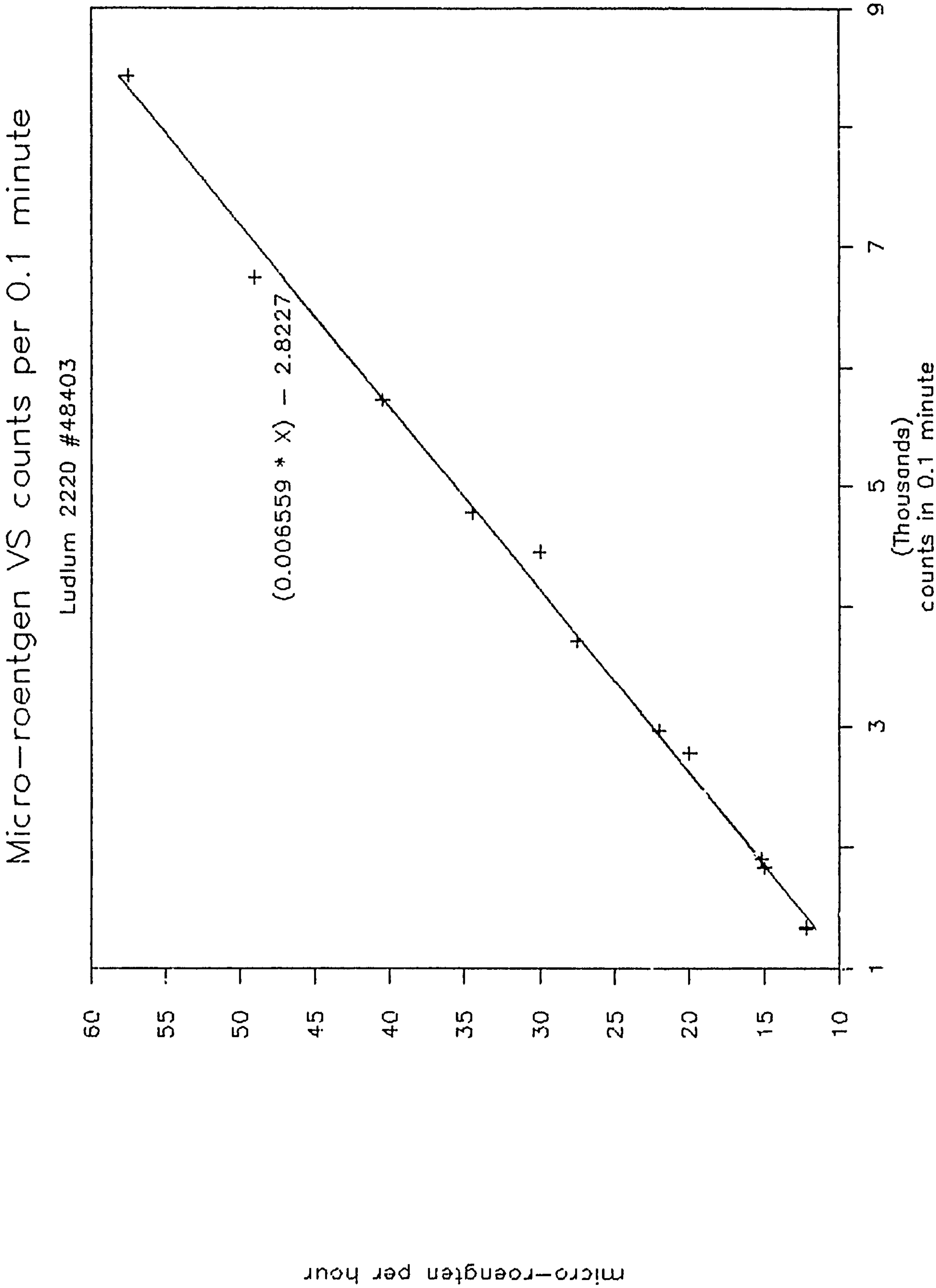


FIGURE P.1 uR/hr vs. CPTM SN48403

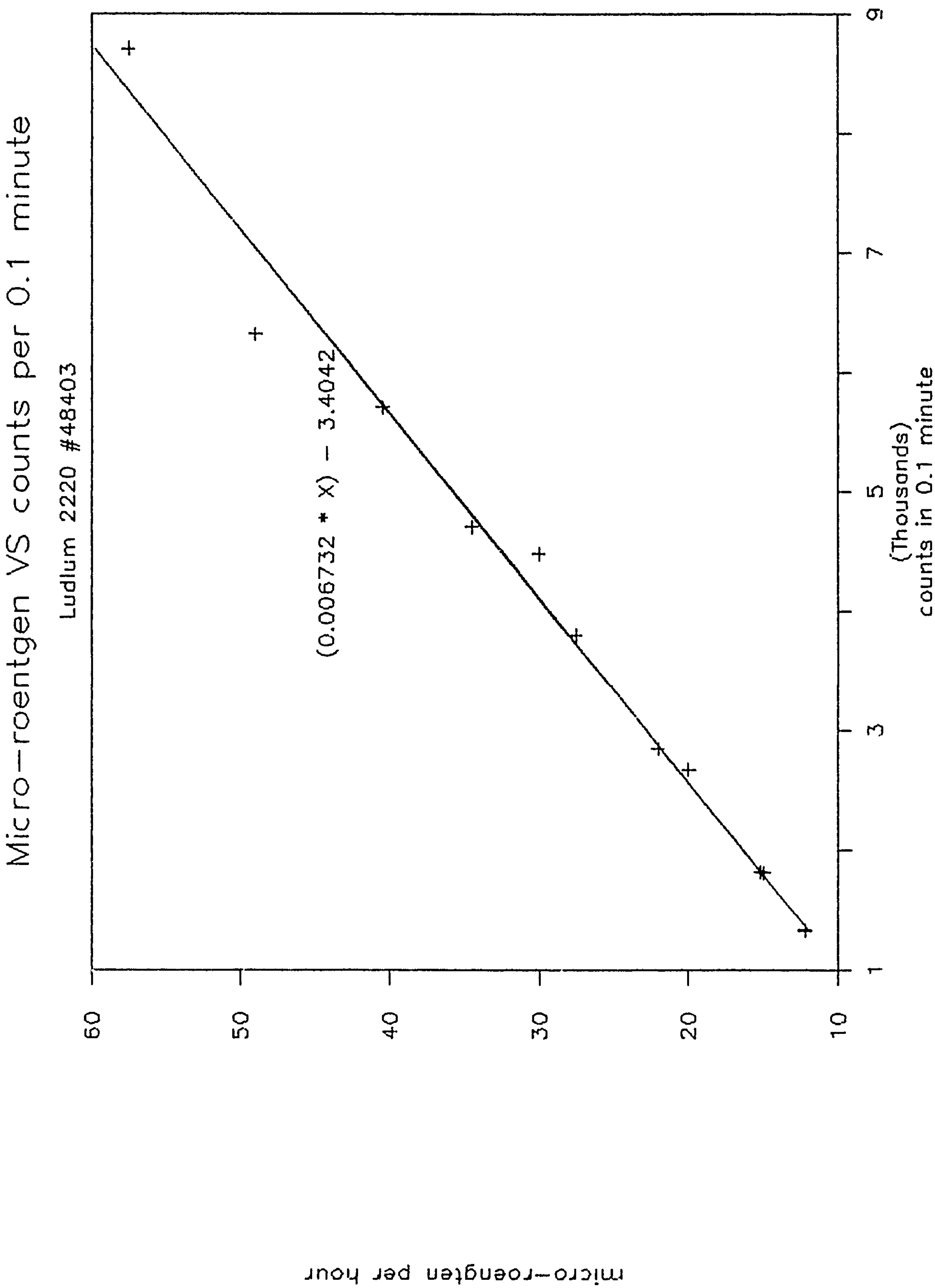


FIGURE P.2 uR/hr vs. CPTM SN1469

COUNTS PER 0.1 MINUTE VERSUS MICRO-ROENTGEN PER HOUR

INSTRUMENT SERIAL NUMBER: 48403

LUDLUM 2220 and 43-10				PIC
1st ct	2nd ct	3rd ct	avg. ct	μR/hr
6749	6857	6657	6754	49
1817	1837	1851	1835	15
1854	1935	1918	1902	15
2975	2880	3050	2968	22
2737	2834	2773	2781	20
4368	4433	4533	4445	30
3718	3719	3715	3717	27
8456	8417	8422	8432	57
5695	5646	5841	5727	40
4749	4846	4736	4777	34
1348	1369	1299	1339	12
1331	1321	--	1326	12

Ludlum 2220 & 43-10 SN48403

Regression Output:

Constant	2.759845
Std Err of Y Est	0.998080
R Squared	0.995877
No. of Observations	12
Degrees of Freedom	10
X Coefficient(s)	0.006518
Std Err of Coef.	0.000132

COUNTS PER 0.1 MINUTE VERSUS MICRO-ROENTGEN PER HOUR

INSTRUMENT SERIAL NUMBER: 1469

ESP-1 and SPA-3 1st ct	2nd ct	3rd ct	avg. ct	PIC μR/hr
6260	6350	6350	6320	49
1830	1780	1840	1817	15
1760	1870	1840	1823	15
2890	2800	2860	2850	22
2620	2760	2660	2680	20
4550	4400	4470	4473	30
3800	3790	3810	3800	27
8630	8780	8710	8707	57
5790	5640	5690	5707	40
4760	4680	4670	4703	34
1320	1320	1330	1323	12
1360	1300		1330	12

Eberline ESP-1 & SPA-3 SN1469

Regression Output:

Constant	3.351590
Std Err of Y Est	1.905287
R Squared	0.984976
No. of Observations	12
Degrees of Freedom	10

X Coefficient(s)	0.006430
Std Err of Coef.	0.000251

APPENDIX 6-D

INITIAL SOIL SAMPLE ACTIVITY BY GAMMA SPECTROSCOPY

GRID BLOCK: 0+05,05L (A-1)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0161	6.6
0162	8.9
0163	10.4
0167	2.0
0186	19.9
0509	1.5
0510	1.4
0512	8.0
0546	2.2
0597	1.4
0604	1.6

GRID BLOCK: 0+05,15L (A-2)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0168	40.5
0171	19.6
0181	6.4
0235	9.3
0511	1.0
1802	0.5

GRID BLOCK: 0+05,35L (A-4)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0164	1.3
0165	7.2
0238	1.3
0343	1.3
0344	1.3
0706	3.6

GRID BLOCK: 0+05,45L (A-5)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0283	2.2
0284	1.6
0287	0.8

GRID BLOCK: 0+05,55L (A-6)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0161	6.6
0311	46.7
0314	30.1
0315	6.2
0316	7.9
0318	212.7
0319	1.4
0320	0.8
0321	0.5
0323	1.1
0324	1.0
0327	1.0
0328	1.2
0329	0.9
0333	1.0
0385	18.7
0386	4.8
2139	0.9
2140	1.5

GRID BLOCK: 0+05,65L (A-7)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0342	4.5
0345	0.3
0346	1.6
0350	2.0
0351	18.6
0352	0.8
0353	1.0
0354	0.4
0367	4.8
0369	9.4
0373	1.2
0393	0.5
0394	0.4
1848	23.5

(2273R)

GRID BLOCK: 0+05,75L (A-8)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0368	2.2
0371	0.3
0374	82.2
0375	1.0
0376	0.6
0395	0.8
0397	1.3
0398	47.2
0837	2.3
0838	8.5
0871	7.8

GRID BLOCK: 0+05,85L (A-9)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0402	6.7
0399	1.8
0400	1.6
0406	4.4
0407	8.1
0408	3.4
0409	3.0
0410	5.0
0411	2.3
0412	6.2
0414	24.1
1159	5.0

GRID BLOCK: 0+05,95L (A-10)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0419	2.4
0420	1.3
0421	0.9
0423	1.5
0457	0.8
1049	6.3

GRID BLOCK: 0+05,105L (A-11)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0161	6.6
0456	1.3
0934	3.0

GRID BLOCK: 0+05,115L (A-12)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0456	1.3
1329	0.8
1330	1.3
1331	1.5
1332	3.7
1335	6.2
1336	3.2
1337	9.7
1340	1.9
1343	5.8

GRID BLOCK: 0+05,125L (A-13)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1327	3.9
1328	3.4
1334	1.4
1342	2.6

(2273R)

GRID BLOCK: 0+05,135L (A-14)	
SAMPLE ID	INITIAL SAMPLE ACTIVITY
1073	2.5
1090	6.9
1100	0.7
1333	0.8
1341	2.9

GRID BLOCK: 0+05,145L (A-15)	
SAMPLE ID	INITIAL SAMPLE ACTIVITY
1086	0.9
1096	1.2
1435	2.0
1436	2.3

GRID BLOCK: 0+05,155L (KA-1)	
SAMPLE ID	INITIAL SAMPLE ACTIVITY
1060	4.0

GRID BLOCK: 0+05,165L (KA-2)	
SAMPLE ID	INITIAL SAMPLE ACTIVITY
0844	6.3
0846	5.7
0911	7.8
0950	1.0

GRID BLOCK: 0+05,175L (KA-3)	
SAMPLE ID	INITIAL SAMPLE ACTIVITY
0842	1.6
0848	4.2
0918	3.1
0944	1.0

GRID BLOCK: 0+05,185L (KA-4)	
SAMPLE ID	INITIAL SAMPLE ACTIVITY
0841	2.1
0851	2.2
0854	3.5
0855	2.5
0923	3.5
0928	5.4
0938	2.3
0939	5.2
0941	1.0
0943	2.4

(2273R)

GRID BLOCK: 0+05,195L (KA-5)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0935	5.1
0936	6.9
0937	4.2
0947	4.3
0948	1.4
0963	3.1

GRID BLOCK: 0+15,05L (B-1)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0153	12.5
0154	4.5
0155	3.5
0156	4.1
0157	4.8
0158	7.8
0159	7.2
0160	5.0
0166	2.5
0169	1.8
0170	3.2
0172	2.5
0173	1.8
0176	.92
0177	2.0
0179	2.8
0180	2.4
0187	6.0
0189	16.2
0197	3.8
0233	1.5

GRID BLOCK: 0+15,15L (B-2)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0177	2.7
0188	1.8
0190	1.6
0191	1.3
0192	1.7
0199	1.5
0200	1.4
0201	3.0
0236	6.0
0260	3.0
0261	2.7
0687	2.1

GRID BLOCK: 0+15,25L (B-3)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0169	1.8
0303	3.6

(2273R)

GRID BLOCK: 0+15,45L (B-5) SAMPLE ID	INITIAL SAMPLE ACTIVITY
0285	96.0
0290	182.0
0291	27.0
0292	231.0
0293	16.1
0294	12.6
0295	2.9
0296	2.0
0297	0.9
0298	3.1
0301	2.5
0304	2.9
0305	1.6
0306	1.2
0307	1.4
0308	1.8
0309	1.9
0310	1.1
0313	1.9
0444	0.9

GRID BLOCK: 0+15,55L (B-6) SAMPLE ID	INITIAL SAMPLE ACTIVITY
0330	0.8
0312	16.2
0317	1.2
0322	0.7
0325	0.7
0326	387.7
0330	0.8
0331	0.7
0332	0.5
0334	0.4
0335	0.8
0336	0.3
0337	11.8
0338	0.3
0340	128.9
0387	3.1
0616	12.7
0617	9.2
0618	0.8
1793	1.6
1794	1.2
1849	6.2

GRID BLOCK: 0+15,65L (B-7) SAMPLE ID	INITIAL SAMPLE ACTIVITY
0339	1.5
0341	3.3
0347	30.8
0355	0.7
0356	23.7
0357	0.8
0359	1.0
0364	0.5
0366	7.4
0372	1.1
0379	0.4
0381	10.3
0382	2.3
0383	92.3
0384	81.9
0390	1.4
0391	0.4
0396	0.3
0547	1.9

GRID BLOCK: 0+15,75L (B-8) SAMPLE ID	INITIAL SAMPLE ACTIVITY
0370	2.2
0389	0.7
0377	0.9
0378	0.7
0389	0.7
0392	3.7
0401	8.5
0402	6.7
0403	0.7
0434-B	80.2
0435-A	34.8
2065	1.2
2066	1.1

GRID BLOCK: 0+15,85L (B-9)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0402	6.7
0413	24.0
0415	8.8
0416	12.4
0417	14.0
0418	3.4
0422	1.6
0428	1.2
0430	57.6
0431	1.3
0432	28.9
0433	26.5
0587	0.9
0591	1.2
0592	0.9
0839	7.3

GRID BLOCK: 0+15,105L (B-11)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0443	3.3
0448	1.2
0460	1.2
0461	0.8
0462	0.9
0463	1.0
0464	0.8
0440	0.7
0441	32.3
0442	5.4
0453	0.7
0454	1.1
0455	1.1
0459	1.4
0586	1.1
0590	1.2

GRID BLOCK: 0+15,115L (B-12)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0456	1.3

GRID BLOCK: 0+15,125L (B-13)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1135	1.6
1344	1.0

GRID BLOCK: 0+15,135L (B-14)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1338	2.5
1339	3.7
1075	1.4
1077	2.0
1079	6.8
1080	0.4
1084	1.3
1085	1.0
1091	0.8
1102	0.7

GRID BLOCK: 0+15,145L (B-15)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1069	2.7
1071	1.7
1072	5.2
1074	1.9
1076	0.8
1078	2.6

GRID BLOCK: 0+15,155L (KB-1)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0952	3.0

GRID BLOCK: 0+15,165L (KB-2)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0951	1.1

GRID BLOCK: 0+15,175L (KB-3)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0954	1.0
0955	0.5

GRID BLOCK: 0+25,05L (C-1)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0175	5.0
0174	2.6
0175	5.0
0182	2.8
0183	2.0
0184	0.6
0185	0.8
0513	1.8

GRID BLOCK: 0+25,15L (C-2)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0215	2.3
0202	9.6
0215	2.3
0216	2.5

GRID BLOCK: 0+25,25L (C-3)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0678	1.7
1773	6.3
1774	11.3
1775	6.4
1776	5.4

GRID BLOCK: 0+25,35L (C-4)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0689	8.0

GRID BLOCK: 0+25,55L (C-6)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0388	1.0
1788	0.7
1789	0.2
1790	0.3
1792	1.1
1795	1.2
1796	5.4
1797	3.2

(2273R)

GRID BLOCK: 0+25,65L (C-7)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0358	1.0
0360	0.3
0362	92.3
0363	0.4
0365	0.02
0494	0.4
0495	0.7
0497	0.3
0571	0.2
0574	0.3
1478	4.8
1479	4.9
1480	4.5
1481	4.0
1482	64.1
1491	0.8
1492	1.7
1493	1.7
1494	3.0
2179	4.5

GRID BLOCK: 0+25,75L (C-8)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0361	1.0
0429	34.5
0476	2.6
0477	33.9
0478	12.0
0579	1.0
0580	0.6
2119	4.8

GRID BLOCK: 0+25,85L (C-9)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0424	2.6
0425	85.5
0427	55.2
0434-A	12.7
0435-B	24.0
0438	0.5
0451	2.5
0472	0.9
0473	0.9
0474	1.7
0475	3.2
0489	0.6
0562	27.0
0567	12.7
0693	1.6
0700	9.5

GRID BLOCK: 0+25,95L (C-10)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0426	27.1
0447	1.1
0467	3.3
0449	0.6
0452	0.8
0467	3.3
0468	1.6
0469	2.1
0470	1.5
0471	2.3
0695	2.1
0697	5.6
1350	1.8
1351	0.4
1352	0.8
1353	1.2
1354	0.7
1355	0.8

GRID BLOCK: 0+25,105L (C-11)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0445	1.4
0450	1.2
0465	12.2
0466	1.0
0662	10.3
0666	5.9
0667	1.1

GRID BLOCK: 0+25,115L (C-12)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0995	1.6
1356	6.3

GRID BLOCK: 0+25,125L (C-13)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1346	[illegible]
[illegible]	[illegible]

GRID BLOCK: 0+25,135L (C-14)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1107	1.2
1108	2.3
1109	1.7
1345	0.8
1347	1.9
1348	4.4
1349	3.7
1363	0.9

GRID BLOCK: 0+25,145L (C-15)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1105	1.6

GRID BLOCK: 0+25,155L (KC-1)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0953	1.4
0956	3.3
1155	1.9

GRID BLOCK: 0+25,165L (KC-2)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0997	1.3
0998	1.7
0999	1.8

GRID BLOCK: 0+35,05L (D-1)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0196	4.9
0203	4.0
0204	2.6
0207	3.9
0208	4.1
0209	1.9

GRID BLOCK: 0+35,05L (D-1)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0210	0.3
0211	5.4
0212	18.6
0234	2.9
0289	1.0
0300	2.3
0515	1.2

GRID BLOCK: 0+35,15L (D-2)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0205	4.4
0206	4.8
0213	1.4
0214	2.7
0232	1.1
028[illegible]	1.2
0288	2.4

GRID BLOCK: 0+35,25L (D-3)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1777	2.0
1778	4.8
1779	6.0
1780	5.4
1783	0.4

GRID BLOCK: 0+35,35L (D-4)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1801	3.3

GRID BLOCK: 0+35,45L (D-5)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1803	0.1
1804	0.9
1805	0.8
1806	1.2

GRID BLOCK: 0+35,55L (D-6)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1495	2.8
1496	7.5
1497	6.3
1498	3.2
0507	1.0
0508	0.7

GRID BLOCK: 0+35,65L (D-7)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0482	8.2
0483	13.8
0484	163.0
0493	0.8
0496	0.8
0498	0.6
0499	0.8
0501	0.8
1499	2.9

GRID BLOCK: 0+35,65L (D-7)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1500	4.3
1501	4.0
1502	3.4
1511	1.8
1512	0.4
1513	0.9
1514	0.6

GRID BLOCK: 0+35,75L (D-8)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0479	0.9
0480	0.6
0481	3.2
0485	4.5
0486	1.7
0487	0.8
0488	1.3
0492	0.9
0840	7.2
1455	1.0
1456	0.6
1457	1.1
1458	0.5
1515	10.8
1516	3.0
1517	1.5
1518	1.7
1527	0.9
1528	0.3
1529	1.2
1530	0.8
1535	1.3
1536	1.2
1537	0.2
1538	0.9
2098	1.4

GRID BLOCK: 0+35,85L (D-9)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0490	1.3
0491	1.1
0561	26.2

(2273R)

GRID BLOCK: 0+35,95L (D-10)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0446	1.4
0560	16.5
0563	9.6

GRID BLOCK: 0+35,105L (D-11)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1373	1.2

GRID BLOCK: 0+35,115L (D-12)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1358	3.8
1361	5.8
1362	2.4
1366	3.1
1367	1.6
1368	1.5
1369	1.5
1370	5.1
1371	1.9
1374	1.5
1375	3.2

GRID BLOCK: 0+35,125L (D-13)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1360	0.9

GRID BLOCK: 0+35,135L (D-14)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1097	0
1110	1
1112	2.9
1359	0.7
1376	1.5
1378	1.5

GRID BLOCK: 0+35,145L (D-15)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1081	14.0
1111	2.2
1364	5.4
1365	1.6
1372	3.1

GRID BLOCK: 0+35,155L (KD-1)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0962	2.0
0967	3.8
0974	1.4
0975	6.2
0976	3.8
0977	1.2
0978	0.9
0979	1.6
0980	1.5
0981	1.7
0996	1.0
1000	1.2
1012	2.2
1094	1.7
1156	4.4

GRID BLOCK: 0+35,165L (KD-2)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0966	3.0
1095	0.7

GRID BLOCK: 0+35,175L (KD-3)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1004	2.1
1005	2.1

GRID BLOCK: 0+45,05L (E-1)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0514	8.4
0522	4.6
0698	6.2
0724	2.3

GRID BLOCK: 0+45,15L (E-2)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0675	9.4
0711	5.5
0717	5.9
0719	4.8
0721	5.1

GRID BLOCK: 0+45,25L (E-3)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0255	4.6
0257	9.7
0259	4.1
0262	0.9
0263	2.8
0686	13.5
0688	3.1
0699	1.4
0720	7.8
0728	5.1
0729	4.2
2180	1.1

GRID BLOCK: 0+45,35L (E-4)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0258	18.6
0526	2.4
0527	3.0
0528	2.4
0529	0.8
1807	5.0
1808	7.9
1809	3.9
1810	8.8

GRID BLOCK: 0+45,55L (E-6)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1815	5.4
1816	4.3
1817	5.5
1820	7.4

GRID BLOCK: 0+45,65L (E-7) SAMPLE ID	INITIAL SAMPLE ACTIVITY	GRID BLOCK: 0+45,75L (E-8) SAMPLE ID	INITIAL SAMPLE ACTIVITY
0500	0.8	1503	15.4
0502	1.8	1504	10.0
0503	15.5	1505	4.60504
0.9		1506	8.7
0505	1.1	1519	1.8
0506	0.9	1520	0.9
1531	20.9	1521	1.4
1532	7.4	1522	0.6
1533	4.4		
1534	12.7		
1539	1.1		
1540	0.9		
1541	0.5		
1542	0.9		
1811	2.2		
1812	10.3		
1813	2.1		
1814	2.3		

GRID BLOCK: 0+45,85L (E-9) SAMPLE ID	INITIAL SAMPLE ACTIVITY	GRID BLOCK: 0+45,95L (E-10) SAMPLE ID	INITIAL SAMPLE ACTIVITY
1459	16.4	1443	1.2
1466	4.3	1444	1.0
1467	5.5	1445	0.9
1468	3.7	1446	1.5
1469	0.2	1447	1.6
1507	4.0	1448	1.7
1508	3.8	1449	1.6
1509	6.6	1450	1.7
1510	26.2	1451	11.2
1523	2.4	1452	11.5
1524	0.9	1453	19.9
1525	1.2	1454	10.9
1526	2.7		
1566	11.8		
1567	2.6		
1624	3.1		
1625	12.9		
1626	10.3		
1627	4.9		
2100	5.2		
2101	3.8		

GRID BLOCK: 0+45,105L (E-11)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1164	4.2
1168	1.2

GRID BLOCK: 0+45,115L (E-12)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1162	8.5
1163	7.1
1381	1.8
1382	1.6
1387	4.0
1388	4.0
1389	3.7

GRID BLOCK: 0+45,125L (E-13)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1383	1.4
1384	2.4
1386	4.3

GRID BLOCK: 0+45,135L (E-14)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1088	3.3
1092	2.7
1113	3.8
1114	3.2
1115	1.6
1116	5.1
1117	3.9
1119	2.0
1122	1.6
1379	1.9
1380	2.3
1385	6.2

GRID BLOCK: 0+45,145L (E-15)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1070	3.5

GRID BLOCK: 0+45,155L (KE-1)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0961	0.8
0964	0.9
0991	1.4
0993	4.0
1019	1.8
1026	1.6
1067	1.1
1066	5.2
1068	3.8

GRID BLOCK: 0+45,165L (KE-2)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1007	0.9
1065	1.5

GRID BLOCK: 0+45,175L (KE-3)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1003	1.3

GRID BLOCK: 0+55,05L (F-1)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0256	19.2
0267	4.4
0270	1.4
0271	3.4
0272	3.5
0273	2.7
0274	4.0
0282	2.1
0517	2.4
0520	4.8
0532	3.9
0652	1.2
0730	4.3

GRID BLOCK: 0+55,15L (F-2)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0276	3.2
0277	12.9
0281	5.4
0731	1.1

GRID BLOCK: 0+55,25L (F-3)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0251	3.4
0252	4.1
0253	18.2
0254	8.2
0264	4.8
0265	5.2
0266	1.0
0542	2.6
0651	1.0
0657	1.1
0658	1.1
0661	1.1
0739	4.0
0740	4.7

GRID BLOCK: 0+55,35L (F-4)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0537	3.3
0539	2.5
0540	2.9
0541	3.7
0544	1.1
0648	1.5
1836	35.6
1837	7.1
1838	4.3
1839	5.2
1840	7.9

GRID BLOCK: 0+55,45L (F-5)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1835	44.4
1843	6.2

GRID BLOCK: 0+55,55L (F-6)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1844	6.5

GRID BLOCK: 0+55,85L (F-9)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1470	0.1
1471	0.6
1472	1.2
1473	0.6

GRID BLOCK: 0+55,95L (F-10)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1460	2.2
2234	2.7
2235	2.0

GRID BLOCK: 0+55,105L (F-11)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1167	4.4
1170	1.2
1171	1.0

GRID BLOCK: 0+55,115L (F-12)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1390	1.9

GRID BLOCK: 0+55,125L (F-13)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1083	6.4
1144	0.9
1377	1.0
1389	1.4
1391	3.5
1408	3.3
1409	2.5
1410	4.3
14[illegible]	4.6
1412	1.4
1413	1.8
1414	2.0

GRID BLOCK: 0+55,135L (F-14)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1082	3.0
1139	30.7
1140	5.8
1143	1.5
1157	3.4
1158	2.3
1702	19.1

GRID BLOCK: 0+55,145L (F-15)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0992	4.1
1118	1.6
1120	2.0
1142	3.6

GRID BLOCK: 0+55,155L (KF-1)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1032	1.2

GRID BLOCK: 0+65,05L (G-1)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0268	4.4
0269	2.3
0516	3.1
0518	2.9
0521	1.0
0531	5.9
0533	3.4
0736	2.8

GRID BLOCK: 0+65,15L (G-2)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0275	2.0
0278	1.7
0530	1.2
0535	1.6
0548	2.1
0549	1.9
0550	1.4
0551	1.3
0552	5.4
0741	1.0
0742	1.9

GRID BLOCK: 0+65,25L (G-3)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0538	3.9
0543	1.8
0553	4.4
0555	6.2
0557	1.0
0558	1.4
0559	1.2

GRID BLOCK: 0+65,35L (G-4)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0534	2.5
0538	3.9

GRID BLOCK: 0+65,45L (G-5)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0554	2.8
0556	2.8

GRID BLOCK: 0+65,65L (G-7)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1557	1.9
1558	0.7
1559	1.8
1560	1.0
1562	13.3
1563	5.9
1564	7.4
1565	6.8

GRID BLOCK: 0+65,75L (G-8)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1547	7.5
1548	4.5
1549	5.9
1550	6.8

GRID BLOCK: 0+65,85L (G-9)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1543	5.9
1544	5.9
1545	3.5
1546	4.5
1568	2.6
1569	2.5
1570	2.0
1571	1.7

GRID BLOCK: 0+65,95L (G-10)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1487	0.5
1488	1.7
1489	1.0
1490	1.8

GRID BLOCK: 0+65,105L (G-11)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1165	1.4
1166	1.4
1172	2.5
1461	2.2
1462	0.8
1463	1.0
1464	0.4

GRID BLOCK: 0+65,115L (G-12)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1393	8.1
1394	1.4
1395	1.1

GRID BLOCK: 0+65,125L (G-13)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1153	2.2
1392	8.6
1404	1.5
1405	2.0
1406	2.4
1407	2.6

GRID BLOCK: 0+65,135L (G-14)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1087	3.3
1121	3.4
1141	7.7
1145	1.3
1146	1.0
1147	1.8

GRID BLOCK: 0+65,155L (KG-1)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1020	2.2
1034	1.8

(2273R)

GRID BLOCK: 0+75,05L (H-1)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0519	2.8
0523	0.9
0536	-0.1
0624	2.1

GRID BLOCK: 0+75,15L (H-2)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0696	2.0

GRID BLOCK: 0+75,25L (H-3)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0380	6.2
0636	1.8
0737	1.8
0738	2.3
1868	1.8

GRID BLOCK: 0+75,35L (H-4)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1858	1.2
1875	0.7
1887	1.1

GRID BLOCK: 0+75,45L (H-5)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1854	11.3
1855	6.9
1856	9.2
1857	6.7
1859	2.1
1889	2.2

GRID BLOCK: 0+75,55L (H-6)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1891	1.5

GRID BLOCK: 0+75,65L (H-7)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
2104	4.1

GRID BLOCK: 0+75,75L (H-8)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1577	6.3
1578	25.8
1579	18.8
1580	15.7
1581	35.8
1582	2.0
1583	11.6
1584	2.8
1585	1.6
2056-A	5.0

(2273R)

GRID BLOCK: 0+75,85L (H-9)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1572	2.0
1573	2.3
1574	2.5
1575	5.5

GRID BLOCK: 0+75,105L (H-11)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1465	1.1

GRID BLOCK: 0+75,115L (H-12)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1396	1.4
1397	1.4
1398	1.6
1399	2.1

GRID BLOCK: 0+75,125L (H-13)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1151	3.2
1152	2.2
1154	3.4
1400	1.8
1401	1.8
1402	2.0
1403	1.3
1415	1.3
1416	1.9
1417	2.0
1418	0.8
1419	2.5
1420	1.7
1421	0.4
1422	2.3
1423	1.2
1424	1.2

GRID BLOCK: 0+75,135L (H-14)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1123	9.3
1124	7.1
1125	7.9
1126	2.3
1130	2.2
1148	2.1
1149	3.0

GRID BLOCK: 0+75,155L (KH-1)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1029	1.5

(2273R)

GRID BLOCK: 0+85,05L (J-1)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0756	5.4
2977	3.6
2978	7.8
2982	4.6
2983	6.4
2984	1.7

GRID BLOCK: 0+85,15L (J-2)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0626	1.2
0776	5.8

GRID BLOCK: 0+85,25L (J-3)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0635	3.4
0637	2.4
0673	22.9

GRID BLOCK: 0+85,35L (J-4)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0631	19.1
2365	1.6

GRID BLOCK: 0+85,65L (J-7)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1311	7.7
1598	9.9
1599	4.0
1600	3.2
1601	8.2
1602	2.3
1603	6.6
1604	4.1
1605	2.6

GRID BLOCK: 0+85,95L (J-10)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1483	1.4
1484	1.0
1485	0.5
1486	2.0

GRID BLOCK: 0+85,125L (J-13)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1129	1.4
1161	8.6
1425	1.3
1426	4.3

GRID BLOCK: 0+85,135L (J-14)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1127	0.6
1128	2.1
1132	1.1
1133	1.5

GRID BLOCK: 0+85,165L (KJ-2)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1024	2.5

GRID BLOCK: 0+95,15L (K-2)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0788	7.0

(2273R)

GRID BLOCK: 0+95,25L (K-3)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0634	2.3
0638	2.4
0672	5.8

GRID BLOCK: 0+95,35L (K-4)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0630	7.8
0633	1.9
0674	30.9
1897	1.4
1898	0.8

GRID BLOCK: 0+95,55L (K-6)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1308	6.4
1309	1.1

GRID BLOCK: 0+95,65L (K-7)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1586	1.0
1587	2.3
1588	0.6
1589	0.9
1895	1.6

GRID BLOCK: 0+95,75L (K-8)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1590	89.7
1591	120.6
1592	124.2
1593	68.8
1594	1.6
1595	574.5
1596	560.1
1597	106.1
1606	114.4
1607	166.9
1608	205.4
1609	313.7
1611	0.03
1612	0.4
1613	0.2
1614	0.8

GRID BLOCK: 0+95,85L (K-9)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1278	1.6
1279	0.7

GRID BLOCK: 0+95,75L (K-8)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1616	0.4
1617	0.17
1618	2.6
1619	2.2
1620	11.2
1621	9.0
1622	9.8
1623	8.8

GRID BLOCK: 0+95,95L (K-10)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1474	0.6
1475	1.0
1476	0.8
1477	0.4

GRID BLOCK: 0+95,125L (K-13)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1150	2.8
1427	5.4
1428	1.4

GRID BLOCK: 0+95,135L (K-14)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1131	0.7

GRID BLOCK: 1+05,05L (L-1)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0654	1.7
0671	4.8
2091	21.5
2093	4.5
2096	3.5

GRID BLOCK: 1+05,15L (L-2)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0605	3.1

GRID BLOCK: 1+05,25L (L-3)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0639	7.9

GRID BLOCK: 1+05,45L (L-5)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1901	3.0
1902	1.7
1903	5.6
1904	8.5
1910	2.7
1911	1.9
1912	1.4

GRID BLOCK: 1+05,55L (L-6)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1296	2.5
1307	0.4
1907	5.7

GRID BLOCK: 1+05,65L (L-7)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1280	1.2
1281	2.3
1293	2.5
1295	1.2
1305	5.6
1306	2.9
1654	0.03
1655	1.0
1656	0.3
1657	1.2

GRID BLOCK: 1+05,75L (L-8)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1658	13.4
1659	8.0
1660	8.2
1661	16.2
1690	17.6
1691	37.7
1692	20.6
1693	17.2

GRID BLOCK: 1+05,85L (L-9)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0881	18.0
1636	7.8
1637	2.7
1638	2.4
1639	5.7
1640	17.5
1641	9.7
1642	24.4

GRID BLOCK: 1+05,125L (L-13)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1429	2.0
1430	1.1
1431	1.0
1432	1.8

GRID BLOCK: 1+05,135L (L-14)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1433	1.4
1434	1.8
1437	0.8
1438	1.7

GRID BLOCK: 1+05,145L (L-15)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1137	0.7

GRID BLOCK: 1+05,155L (KL-1)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1136	2.4

GRID BLOCK: 1+15,05L (M-1)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0774	7.5
0775	7.8
2455	3.5
2456	2.0

(2273R)

GRID BLOCK: 1+15,15L (M-2)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0595	2.2
0609	2.4
0610	4.5
0668	7.8
0670	3.2

GRID BLOCK: 1+15,25L (M-3)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0664	2.3
0665	6.0
0822	2.8

GRID BLOCK: 1+15,35L (M-4)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0599	5.8
0600	11.1
0601	10.6
0606	1.0
0607	1.2
0608	1.7
0611	2.4
0612	1.1
0663	3.20669 4.4

GRID BLOCK: 1+15,45L (M-5)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1917	17.1
1918	5.6
1970	1.2
1971	2.1
2195	1.5

GRID BLOCK: 1+15,55L (M-6)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0786	1.1
1304	4.2
1766	2.0
1767	1.1
1768	1.6
1769	1.0
1310	2.9
1800	1.2

GRID BLOCK: 1+15,65L (M-7)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1284	8.9
1294	1.3
1302	6.1
1694	4.4
1695	2.9
1696	2.0
1697	4.7

GRID BLOCK: 1+15,75L (M-8)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1277	1.5
1281	1.0
1650	0.4
1651	0.4
1652	0.5
1653	0.4

GRID BLOCK: 1+15,85L (M-9)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1643	0.9
1644	0.9
1645	1.3
1646	0.2
1647	0.9
1648	1.0
1649	1.3

GRID BLOCK: 1+15,95L (M-10)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0882	7.5

GRID BLOCK: 1+15,115L (M-12)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0884	6.2

GRID BLOCK: 1+15,125L (M-13)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1134	2.1

GRID BLOCK: 1+25,15L (N-2)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0582	4.8
0594	2.9
0659	4.2
0660	2.5

GRID BLOCK: 1+25,25L (N-3)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0598	2.0
0655	3.4

GRID BLOCK: 1+25,35L (N-4)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0593	1.7
0596	10.6
0650	5.6
0653	6.2
1980	0.6
1981	1.3
1982	2.1

GRID BLOCK: 1+25,55L (N-6)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1276	3.4
1292	5.8
1297	2.4
1298	2.9
1299	3.1
1301	3.4

GRID BLOCK: 1+25,65L (N-7)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0800	259.5
1275	4.2
1303	2.2
1713	11.8
1714	12.9
1715	15.2
1716	10.9
1743	2.4
1744	0.6
1745	0.6

GRID BLOCK: 1+25,75L (N-8)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0889	24.1
0892	2.1
0896	3.8
0902	9.4
1274	3.1

GRID BLOCK: 1+25,85L (N-9)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0886	10.7
0891	5.7

(2273R)

GRID BLOCK: 1+25,95L (N-10)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0874	3.6

GRID BLOCK: 1+25,105L (N-11)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1555	1.5
1556	1.6

GRID BLOCK: 1+25,115L (N-12)

SAMPLE ID	INITIAL SAMPLE ACTIVITY	
0856	2.1	
0857	3.8	
2.2		1441

GRID BLOCK: 1+25,125L (N-13)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1439	3.6
1440	5.10865
4.0	
1442	4.9

GRID BLOCK: 1+25,135L (N-14)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1138	1.0

GRID BLOCK: 1+35,05L (P-1)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0768	1.3

GRID BLOCK: 1+35,15L (P-2)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0573	0.9
0577	67.7
0583	2.9
0584	1.8
0647	3.1
0649	4.8

GRID BLOCK: 1+35,25L (P-3)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0645	2.4
0646	3.3

GRID BLOCK: 1+35,35L (P-4)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0570	3.3
0585	2.4
0588	2.2
0589	1.8
0643	2.7
0644	3.2
1983	1.8
2060	1.5
2061	1.9

GRID BLOCK: 1+35,45L (P-5)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1984	1.5
1985	1.2
1986	1.8

GRID BLOCK: 1+35,55L (P-6)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1267	3.6
1269	1.8
1270	2.5
1288	1.8
1289	1.2
1291	3.0
1300	5.1

GRID BLOCK: 1+35,65L (P-7)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1266	4.4
1285	3.8
1286	5.4
1287	12.4
1290	1.5
1314	4.3
1315	1.4
1725	2.3
1726	1.2
1727	1.2
1728	1.6
1729	1.4
1730	0.8
1731	0.8

GRID BLOCK: 1+35,85L (P-9)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0878	3.5
0887	9.7
1312	4.4
1316	2.8
1635	1.0
1628	1.3
1629	2.0
1630	1.4
1631	1.7
1632	0.9
1633	0.6
1634	0.4

GRID BLOCK: 1+35,95L (P-10)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0875	3.8
0880	3.0

GRID BLOCK: 1+35,105L (P-11)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1553	1.0
1554	2.4

GRID BLOCK: 1+35,115L (P-12)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0862	1.6

GRID BLOCK: 1+45,05L (R-1)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0772	2.0
0773	1.4

GRID BLOCK: 1+45,15L (R-2)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0575	1.5

(2273R)

GRID BLOCK: 1+45,25L (R-3)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0564	0.9
0568	4.6
0701	4.3
0703	5.9

GRID BLOCK: 1+45,35L (R-4)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0569	1.3
0572	1.1
0576	9.8
0578	1.7
0581	1.0
0705	1.3
2059	1.0

GRID BLOCK: 1+45,45L (R-5)

SAMPLE ID	INITIAL SAMPLE ACTIVITY	
1241	2.5	
1698	1.0	
0.4		0900
1700	1.0	
1701	0.4	
2194	0.9	

GRID BLOCK: 1+45,55L (R-6)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0799	10.2
0899	28.41699
177.0	
0908	3.1
1245	1.0
1246	1.5
1247	13.7
1248	2.7
1251	1.8
1252	0.6
1254	1.8
1258	0.7
1260	2.3
1271	2.1

GRID BLOCK: 1+45,65L (R-7)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0898	16.5
0906	2.8
1240	8.2
1242	0.9
1243	7.8
1244	0.5
1249	3.6
1250	5.6
1253	11.5
1255	0.8
1257	1.4
1259	1.1
1261	1.1
1262	0.9
1264	1.3

GRID BLOCK: 1+45,75L (R-8)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0888	11.9
0901	6.2
0905	1.4
1239	2.6
1265	3.3

(2273R)

GRID BLOCK: 1+45,65L (R-7)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1268	7.4
1273	2.0
1703	0.2
1704	0.5
1705	0.2
1706	0.2

GRID BLOCK: 1+45,85L (R-9)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0877	3.0
0885	7.1
1551	1.1
1552	1.1
1561	4.6
1576	2.0
1610	1.4

GRID BLOCK: 1+45,95L (R-10)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0879	1.7

GRID BLOCK: 1+45,105L (R-11)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0861	1.7

GRID BLOCK: 1+45,115L (R-12)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0864	1.3

GRID BLOCK: 1+45,155L (KR-1)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1031	1.6

GRID BLOCK: 1+45,165L (KR-2)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
2412	7.0

GRID BLOCK: 1+55,55L (S-6)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0907	5.4
1235	1.8
1236	2.5
1256	1.2

GRID BLOCK: 1+55,65L (S-7)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0895	14.5
0897	2.4
0903	1.8
0904	5.3
2853	7.4
2895	3.9
2896	38.2
2897	8.2
2900	1.9
2901	3.3
2902	4.1

(2273R)

GRID BLOCK: 1+55,75L (S-8)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0869	31.6
0883	10.2
0894	1.5
1237	1.0
1238	1.8
2851	6.7
2854	5.8
2855	1.4
2856	4.6
2857	5.4
2858	0.4
2859	5.7
2873	7.8
2874	9.7
2875	1.2
2876	2.6

GRID BLOCK: 1+55,85L (S-9)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0870	2.7
0893	1.6
2860	2.6
2861	9.6
2862	2.0
2903	3.4
2904	0.7
2905	1.1
2906	1.3

GRID BLOCK: 1+55,135L (S-14)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
2867	2.1
2891	2.3
2908	1.5
2909	1.7
2910	2.1

GRID BLOCK: 1+55,155L (KS-1)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1036	4.6
1046	4.9
2357	-3.4
2898	3.9
2899	3.0

GRID BLOCK: 1+55,95L (S-10)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0863	2.7
0868	2.9
0876	2.3
2863	1.5

GRID BLOCK: 1+55,105L (S-11)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0858	4.2
0859	2.1
0867	2.4
2870	2.4
2871	2.8

(2273R)

GRID BLOCK: 1+55,115L (S-12)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0860	1.6
0866	2.1
0872	1.8
0873	1.7
2868	2.6
2872	0.8
2886	4.1
2889	2.3
2890	2.0

GRID BLOCK: 1+55,125L (S-13)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
2869	2.3
2887	2.1
2888	2.6

GRID BLOCK: 1+55,165L (KS-2)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
2358	5.3
2427	3.5
2429	4.6
2433	2.0
2436	1.8
2438	3.1
2440	2.3

GRID BLOCK: 1+55,175L (KS-3)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
2359	3.1
2413	2.8
2415	2.4
2416	3.2
2417	1.4
2418	1.0
2419	3.8
2420	6.5
2421	.02
2439-A	1.9

GRID BLOCK: 1+55,185L (KS-4)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
2360	3.0

GRID BLOCK: 1+75,55L (V-6)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
2168	2.8
2169	2.7
2170	0.6
2171	7.2
2172	2.7
2181	4.7
2182	4.3
2183	11.5
2184	3.8
2185	6.6
2186	2.3
2187	4.2
2188	2.5

(2273R)

GRID BLOCK: 1+75,65L (V-7)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1886	11.4
1888	33.0
1890	9.3
1892	28.3
1893	47.0
1899	18.0
1900	23.2
2131	1.0
2132	2.2
2133	0.8
2134	0.9
2135	0.9
2136	1.4
2191	1.1
2192	1.5
2193	1.8
2196	4.8
2197	6.3
2198	4.4
2199	0.9
1870	2.2
1871	1.8
1872	1.8
1873	1.9
1874	1.7
1876	0.5
1877	0.2
1878	0.9
1879	19.3

GRID BLOCK: 1+75,65L (V-7)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1818	0.9
1819	1.1
1820	7.4
1821	1.3
1822	1.3
1823	1.0
1824	0.7
1825	0.6
1826	1.0
1827	1.0
1828	0.5
1829	1.5
1830	4.6
1831	3.1
1832	1.0
1833	1.0
1841	0.6
1842	1.2
1845	3.8
1846	2.7
1850	5.1
1851	0.3
1852	2.1
1853	1.4
1860	1.8
1861	16.0
1862	2.1
1863	1.7
1864	9.1

GRID BLOCK: 1+75,65L (V-7)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1880	0.9
1881	1.7
1882	3.5
1883	198.0
1884	2.5
1885	13.6

GRID BLOCK: 1+75,65L (V-7)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1865	2.5
1866	1.9
1867-A	1.4
1867	0.9
1869	0.7

GRID BLOCK: 1+75,75L (V-8)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
2118	0.7
2128	1.6
2129	0.6
2208	6.7
2209	7.2
2210	0.9
2213	2.9

GRID BLOCK: 1+75,85L (V-9)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
2114	1.7
2117	1.0
2130	3.6
2159	14.6
2160	7.7
2177	1.1
2178	10.8
2219	27.6
2220	25.8
2221	13.5
2222	5.0
2223	7.1
2248	2.9
2249	3.1
2255	7.0
2256	16.1
2263	5.5
2264	16.2
2297	2.4

GRID BLOCK: 1+75,95L (V-10)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
2097	1.3
2099	1.2
2102	1.4
2103	2.1
2108	2.0
2111	1.3
2112	2.9
2113	9.7
2115	1.6
2116	1.9
2155	4.0
2156	2.9

GRID BLOCK: 1+75,105L (V-11)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
2094	1.0
2095	1.5
2105	1.7

(2273R)

GRID BLOCK: 1+75,115L (V-12)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
2073	1.5
2074	1.3
2075	2.1
2076	2.0
2077	0.4
2078	42.3
2080	1.1
2081	2.6
2082	3.0
2083	2.3
2084	3.1
2085	1.3
2086	4.9
2087	5.4
2088	1.5
2089	1.8
2090	1.3
2092	3.2

GRID BLOCK: 1+75,125L (V-13)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
2062	1.1
2063	1.3
2064	2.2
2254	3.1

GRID BLOCK: 1+75,135L (V-14)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
2054	1.0
2055	0.4
2056	0.8
2057	1.6
2058	1.9
2279	11.8
2283	2.4

GRID BLOCK: 1+75,145L (V-15)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
2048	0.8
2049	1.1
2050	2.1
2051	0.8
2052	1.4
2053	0.2
2274	1.9
2282	2.6

GRID BLOCK: 1+75,155L (KV-1)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
2024	7.1
2025	0.5
2026	0.5
2275	4.8
2276	1.2
2284	4.0

GRID BLOCK: 1+75,165L (KV-2)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
2016	0.9
2017	1.1
2018	1.0
2071	6.9
2072	9.8
2079	2.7
2286	2.8

(2273R)

GRID BLOCK: 1+75,175L (KV-3)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
2019	20.6
2296	1.9
2298	2.3

GRID BLOCK: 1+85,55L (W-6)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
2385	1.6
2386	1.5

GRID BLOCK: 1+85,65L (W-7)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
2384	0.9

GRID BLOCK: 1+85,75L (W-8)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
2374	3.0

GRID BLOCK: 1+85,85L (W-9)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
2373	4.2
2383	3.8

GRID BLOCK: 1+85,105L (W-11)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
2366	3.8
2378	2.3
2379	4.9
2381	2.2

GRID BLOCK: 1+85,115L (W-12)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
2370	3.1
2377	4.7
2380	1.9

GRID BLOCK: 1+85,125L (W-13)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
2362	2.5
2375	2.3
2376	3.0

GRID BLOCK: 1+85,185L (KW-4)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
2005	1.1
2008	2.1
2009	0.9
2014	3.3
2015	1.3

GRID BLOCK: 1+85,195L (KW-5)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
2003	0.9
2006	0.7
2327	2.0

GRID BLOCK: 1+85,205L (JW-1)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
2004	1.2
2007	1.8
2163	0.9

GRID BLOCK: 1+85,215L (JW-2)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
2002	0.7
2323	3.2

(2273R)

GRID BLOCK: 1+85,225L (JW-3)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1995	0.8
1996	1.2
1997	1.0
1998	1.9
1999	1.6
2335	2.0

GRID BLOCK: 1+85,235L (JW-4)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1967	1.0
1975	0.3
1987	0.9
1988	0.7
1989	0.7
1990	0.8
1991	0.9
1992	1.7
1993	0.9
1994	1.2

GRID BLOCK: 1+85,245L (HW-1)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1957	0.5
1958	0.7
1959	3.5
1964	1.1
1968	0.7
1969	0.8
1972	0.2
1976	1.1
1977	1.1
2340	1.7
2341	19.1

GRID BLOCK: 1+85,255L (HW-2)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1944	0.6
1945	0.5
1948	0.8
1960	87.2
1961	0.6

GRID BLOCK: 1+85,265L (HW-3)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1934	0.5
1935	0.8
1936	0.3
1937	10.5
1938	0.2
1939	2.8
1949	1.0
1962	0.6
1963	1.0

GRID BLOCK: 1+85,275L (HW-4)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1927	0.6
1928	0.7
1932	0.6
1933	0.6

GRID BLOCK: 1+85,285L (HW-5)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1929	1.0
2347	2.3

GRID BLOCK: 1+85,295L (HW-6)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1905	0.3
1906	1.0
1908	0.9
1909	0.7
1913	0.4
1914	0.8
1915	0.9
1916	1.4
1919	0.6
1920	1.2
1923	0.5
1924	1.1
1925	0.6
1926	2.4

GRID BLOCK: 0+5,05R (AA-1)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0602	2.1
0603	1.0

GRID BLOCK: 0+25,05R (AC-1)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0545	3.1

GRID BLOCK: 0+55,05R (AF-1)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0625	1.4

GRID BLOCK: 0+65,05R (AG-1)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0615	15.4

GRID BLOCK: 0+85,05R (AJ-1)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0613	1.5
0614	2.2
0619	1.9
0620	1.8
0621	1.5
0622	2.6
0623	1.8

GRID BLOCK: 1+05,05R (AL-1)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0524	128.4

(2273R)

GRID BLOCK: 0-5,05L (CA-1)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0640	30.8
0641	4.4
0642	1.8
2303	8.8

GRID BLOCK: 0-5,15L (CA-2)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1770	1.0
1772	0.5
1798	1.2
2217	0.9
2218	1.5

GRID BLOCK: 0-5,25L (CA-3)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0679	4.1
0680	11.9
0681	2.8
0682	26.0
0683	1.5
0684	26.2
0685	2.8
0690	77.9
0708	1.7
0709	0.9
0710	1.5
0715	2.0
0716	13.1
1771	0.7

GRID BLOCK: 0-5,35L (CA-4)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0676	1.4
0677	4.1
0691	12.0
0692	7.6
0702	4.3
0714	4.0
0958	5.3
1781	0.3
1782	1.2
1784	7.2
1786	3.3
1787	2.7
2321	10.1
2322	13.8

GRID BLOCK: 0-5,45L (CA-5)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0712	4.8
0713	13.7
0718	5.5
0722	5.1
0723	1.8
0750	3.3
0752	3.5
0959	4.2
1785	1.0
2265	8.2
2266	5.4

GRID BLOCK: 0-5,55L (CA-6)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0725	3.7
0727	4.5
0732	14.1
0733	11.5
0744	4.2
0751	2.4
0960	16.8
0965	2.0

GRID BLOCK: 0-5,65L (CA-7)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0734	2.9
0743	2.4
0745	5.8
0748	48.4
0749	2.8
0987	2.9
0988	5.0
0990	19.4
1001	2.4
1002	2.2
1014	1.3

GRID BLOCK: 0-5,75L (CA-8)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0746	4.7
0747	2.9
0986	4.0
1023	1.3

GRID BLOCK: 0-5,85L (CA-9)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0753	3.1
0754	2.4
0983	2.7
1050	3.8

GRID BLOCK: 0-5,95L (CA-10)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0757	5.5
0989	2.4
1008	2.7
1015	1.7
1017	1.8
1018	1.8
1022	1.0
1025	1.4
1027	1.7
1048	3.8

GRID BLOCK: 0-5,105L (CA-11)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0926	0.2

GRID BLOCK: 0-5,115L (CA-12)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1054	3.5

GRID BLOCK: 0-5,135L (GA-2)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1051	0.6
1098	0.7
1099	0.8
1101	1.2

GRID BLOCK: 0-5,145L (GA-3)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0946	2.0
0957	6.5
1052	1.6
1053	1.2
1056	3.6
1058	27.6
1064	11.3

(2273R)

GRID BLOCK: 0-5,155L (GA-4)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0909	7.8
0910	10.4
0913	1.2
0945	1.6
0949	4.3
1059	2.8
1062	3.3
1089	0.9
1093	2.4

GRID BLOCK: 0-5,165L (GA-5)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0845	2.0
0912	5.0
0917	4.3

GRID BLOCK: 0-5,175L (GA-6)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0843	4.9
0852	2.0
0940	1.7

GRID BLOCK: 0-5,185L (GA-7)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0847	1.2
0849	4.1
0850	11.7
0853	1.7
0914	1.3
0915	2.2
0916	1.5
0919	1.0
0920	1.6
0921	3.2
0922	2.7

GRID BLOCK: 0-5,195L (GA-8)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0924	5.2
0925	1.4
0927	1.0
0929	6.1
0931	3.1
0932	6.4
0942	1.0
1319	6.5
1321	3.7

GRID BLOCK: 0-15,05L (CB-1)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
2306	16.4

(2273R)

GRID BLOCK: 0-15,15L (CB-2)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0971	1.8
1799	0.8
2305	3.4

GRID BLOCK: 0-15,35L (CB-4)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0704	6.4
0707	4.2

GRID BLOCK: 0-15,65L (CB-7)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0994	1.5
1009	1.3
1055	22.8
1061	4.5
1063	3.8
1160	4.2

GRID BLOCK: 0-15,75L (CB-8)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0972	5.6

GRID BLOCK: 0-15,95L (CB-10)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0968	5.1
0969	5.7
1028	2.3

GRID BLOCK: 0-15,105L (CB-11)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
0982	7.8
0984	1.4
1042	1.9

GRID BLOCK: 0-15,115L (GB-1)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1037	1.5
1047	3.0

GRID BLOCK: 0-15,145L (GB-4)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1053	0.8

GRID BLOCK: 0-15,165L (GB-6)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1041	3.6
5.2	

GRID BLOCK: 0-25,05L (CC-1)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
2304	
2308	1.9

GRID BLOCK: 0-25,15L (CC-2)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1791	1.1
2307	2.9

GRID BLOCK: 0-25,55L (CC-6)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1010	1.9

(2273R)

GRID BLOCK: 0-25,65L (CC-7)

SAMPLE ID SAMPLE	INITIAL SAMPLE ACTIVITY
1013	3.7
1039	2.5

GRID BLOCK: 0-25,95L (CC-10)

SAMPLE ID	INITIAL ACTIVITY
0970	3.1
0973	3.3
0985	17.2
1038	3.7
1040	4.5
1044	5.6
1045	4.2
1057	3.8
1169	1.7

GRID BLOCK: 0-25,105L (CC-11)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1011	4.0
1103	2.5

GRID BLOCK: 0-25,125L (GC-2)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
1043	5.5

GRID BLOCK: 0-35,35L (CD-4)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
2348	2.1

GRID BLOCK: 0-35,45L (CD-5)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
2271	8.5
2272	7.5
2273	7.4
2277	4.9
2278	12.6

GRID BLOCK: 0-35,55L (CD-6)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
2269	14.4
2270	8.5

GRID BLOCK: 0-45,05L (CE-1)

SAMPLE ID	INITIAL SAMPLE ACTIVITY
2393	180.4
2394	1.4

(2273R)

APPENDIX 6-E

FINAL (VERIFICATION) SOIL SAMPLE ACTIVITY BY GAMMA SPECTROSCOPY

GENERAL

Shown below is a legend of the sample identification system employed of the verification sample collected.

LD - SV 0217 - A - 0 + 05 - 005 - L

- 005 — IDENTIFIES THE NUMERIC GRID LINE EAST OR WEST OF THE ORIGIN
- 0 + 05 — IDENTIFIES THE NUMERIC GRID LINE TRAVELING NORTH OR SOUTH OF ORIGIN
- A — IDENTIFIES THE ALPHA-NUMERIC GRID LINE
- 0217 — INDICATES THE UNIQUE SAMPLE NUMBER
- SV = SOIL VERIFICATION
- LD = LANSDOWNE

NOTE: Final Ra-226 results denoted by a dash (-) were less than minimum detectable activity.

(2272R)

SAMPLE ID	LOCATION	FINAL Ra-226	AVERAGE PER GRID
LD-SV-0217-A-0+05-005-L	A-01	4.4	
LD-SV-0218-A-0+05-005-L	A-01	5.0	4.7
LD-SV-0239-A-0+05-015-L	A-02	2.9	
LD-SV-0240-A-0+05-015-L	A-02	2.7	2.8
LD-SV-0249-A-0+05-025-L	A-03	3.5	
LD-SV-0250-A-0+05-025-L	A-03	.7	2.1
LD-SV-0343-A-0+05-035-L	A-04	1.3	
LD-SV-0344-A-0+05-035-L	A-04	1.3	1.3
LD-SV-0405-A-0+05-045-L	A-05	5.3	
LD-SV-0404-A-0+05-045-L	A-05	4.1	4.7
LD-SV-2793-A-0+05-055-L	A-06	3.7	
LD-SV-2794-A-0+05-055-L	A-06	3.3	3.5
LD-SV-0832-A-0+05-065-L	A-07	2.6	
LD-SV-0831-A-0+05-065-L	A-07	3.2	2.9
LD-SV-2821-A-0+05-075-L	A-08	2.2	
LD-SV-2822-A-0+05-075-L	A-08	3.2	2.7
LD-SV-0836-A-0+05-085-L	A-09	4.3	
LD-SV-0835-A-0+05-085-L	A-09	3.6	4.0
LD-SV-0833-A-0+05-095-L	A-10	3.8	
LD-SV-0834-A-0+05-095-L	A-10	4.1	4.0
LD-SV-1717-A-0+05-105-L	A-11	3.0	
LD-SV-1718-A-0+05-105-L	A-11	3.2	3.1
LD-SV-1756-A-0+05-115-L	A-12	2.1	
LD-SV-1755-A-0+05-115-L	A-12	2.5	2.3
LD-SV-1667-A-0+05-125-L	A-13	1.6	
LD-SV-1666-A-0+05-125-L	A-13	2.2	1.9
LD-SV-1764-A-0+05-135-L	A-14	2.3	
LD-SV-1763-A-0+05-135-L	A-14	3.3	2.8
LD-SV-1685-A-0+05-145-L	A-15	2.6	
LD-SV-1684-A-0+05-145-L	A-15	2.6	2.6
LD-SV-0219-B-0+15-005-L	B-01	4.2	
LD-SV-0220-B-0+15-005-L	B-01	3.9	4.1
LD-SV-0241-B-0+15-015-L	B-02	5.4	
LD-SV-0242-B-0+15-015-L	B-02	4.0	4.7
LD-SV-0245-B-0+15-025-L	B-03	3.2	
LD-SV-0246-B-0+15-025-L	B-03	2.7	3.0
LD-SV-2756-B-0+15-035-L	B-04	4.4	
LD-SV-2755-B-0+15-035-L	B-04	4.7	4.6
LD-SV-2784-B-0+15-045-L	B-05	3.4	
LD-SV-2783-B-0+15-045-L	B-05	2.0	2.7
LD-SV-2465-B-0+15-055-L	B-06	3.4	
LD-SV-2466-B-0+15-055-L	B-06	3.2	3.3
LD-SV-2790-B-0+15-065-L	B-07	2.7	
LD-SV-2789-B-0+15-065-L	B-07	2.0	2.3
LD-SV-2832-B-0+15-075-L	B-08	3.0	
LD-SV-2831-B-0+15-075-L	B-08	4.0	3.5
LD-SV-2788-B-0+15-085-L	B-09	1.8	
LD-SV-2787-B-0+15-085-L	B-09	2.0	1.9

(2271R)

SAMPLE ID	LOCATION	FINAL Ra-226	AVERAGE PER GRID
LD-SV-2231-B-0+15-095-L	B-10	2.1	
LD-SV-2230-B-0+15-095-L	B-10	2.5	2.3
LD-SV-1722-B-0+15-105-L	B-11	3.6	
LD-SV-1721-B-0+15-105-L	B-11	2.6	3.1
LD-SV-1739-B-0+15-115-L	B-12	3.1	
LD-SV-1740-B-0+15-115-L	B-12	2.5	2.8
LD-SV-1678-B-0+15-125-L	B-13	2.2	
LD-SV-1679-B-0+15-125-L	B-13	2.4	2.3
LD-SV-1762-B-0+15-135-L	B-14	1.3	
LD-SV-1761-B-0+15-135-L	B-14	1.7	1.5
LD-SV-1672-B-0+15-145-L	B-15	2.2	
LD-SV-1673-B-0+15-145-L	B-15	2.1	2.2
LD-SV-0244-C-0+25-005-L	C-01	2.4	
LD-SV-0243-C-0+25-005-L	C-01	2.4	2.4
LD-SV-0246-C-0+25-015-L	C-02	3.2	
LD-SV-0247-C-0+25-015-L	C-02	3.7	3.5
LD-SV-2673-C-0+25-025-L	C-03	3.2	
LD-SV-2674-C-0+25-025-L	C-03	2.2	2.7
LD-SV-2746-C-0+25-035-L	C-04	2.8	
LD-SV-2745-C-0+25-035-L	C-04	2.7	2.7
LD-SV-2767-C-0+25-045-L	C-05	2.7	
LD-SV-2768-C-0+25-045-L	C-05	2.2	2.5
LD-SV-2798-C-0+25-055-L	C-06	2.0	
LD-SV-2797-C-0+25-055-L	C-06	3.0	2.5
LD-SV-2837-C-0+25-065-L	C-07	1.6	
LD-SV-2838-C-0+25-065-L	C-07	1.7	1.5
LD-SV-2819-C-0+25-075-L	C-08	1.6	
LD-SV-2820-C-0+25-075-L	C-08	1.8	1.7
LD-SV-2796-C-0+25-085-L	C-09	1.0	
LD-SV-2795-C-0+25-085-L	C-09	1.2	1.1
LD-SV-0565-C-0+25-095-L	C-10	1.1	
LD-SV-0566-C-0+25-095-L	C-10	1.6	1.4
LD-SV-1735-C-0+25-105-L	C-11	2.3	
LD-SV-1736-C-0+25-105-L	C-11	2.9	2.6
LD-SV-1724-C-0+25-115-L	C-12	2.0	
LD-SV-1723-C-0+25-115-L	C-12	2.4	2.2
LD-SV-1688-C-0+25-125-L	C-13	4.2	
LD-SV-1689-C-0+25-125-L	C-13	3.6	3.9
LD-SV-1707-C-0+25-135-L	C-14	1.2	
LD-SV-1708-C-0+25-135-L	C-14	1.3	1.3
LD-SV-1751-C-0+25-145-L	C-15	2.3	
LD-SV-1752-C-0+25-145-L	C-15	2.0	2.2
LD-SV-0299-D-0+35-005-L	D-01	3.8	
LD-SV-0300-D-0+35-005-L	D-01	-	3.8
LD-SV-0279-D-0+35-015-L	D-02	3.2	
LD-SV-0280-D-0+35-015-L	D-02	2.3	2.7

(2271R)

SAMPLE ID	LOCATION	FINAL Ra-226	AVERAGE PER GRID
LD-SV-2681-D-0+35-025-L	D-03	3.3	
LD-SV-2682-D-0+35-025-L	D-03	1.4	2.3
LD-SV-2779-D-0+35-035-L	D-04	2.0	
LD-SV-2780-D-0+35-035-L	D-04	2.9	2.5
LD-SV-2765-D-0+35-045-L	D-05	1.6	
LD-SV-2766-D-0+35-045-L	D-05	1.7	1.6
LD-SV-2812-D-0+35-055-L	D-06	2.2	
LD-SV-2811-D-0+35-055-L	D-06	1.4	1.8
LD-SV-2844-D-0+35-065-L	D-07	2.8	
LD-SV-2843-D-0+35-065-L	D-07	3.7	3.2
LD-SV-2825-D-0+35-075-L	D-08	2.7	
LD-SV-2826-D-0+35-075-L	D-08	3.2	3.0
LD-SV-2772-D-0+35-085-L	D-09	5.7	
LD-SV-2771-D-0+35-085-L	D-09	6.4	4.8
LD-SV-2228-D-0+35-095-L	D-10	3.3	
LD-SV-2229-D-0+35-095-L	D-10	2.9	3.2
LD-SV-1757-D-0+35-105-L	D-11	3.4	
LD-SV-1758-D-0+35-105-L	D-11	2.3	2.2
LD-SV-1676-D-0+35-115-L	D-12	2.1	
LD-SV-1677-D-0+35-115-L	D-12	1.8	2.2
LD-SV-1670-D-0+35-125-L	D-13	2.7	
LD-SV-1671-D-0+35-125-L	D-13	2.5	2.5
LD-SV-1737-D-0+35-135-L	D-14	2.4	
LD-SV-1738-D-0+35-135-L	D-14	2.7	3.7
LD-SV-1674-D-0+35-145-L	D-15	4.6	
LD-SV-1675-D-0+35-145-L	D-15	4.4	4.4
LD-SV-0809-E-0+45-005-L	E-01	2.9	
LD-SV-0810-E-0+45-005-L	E-01	2.5	2.7
LD-SV-0811-E-0+45-015-L	E-02	4.1	
LD-SV-0812-E-0+45-015-L	E-02	4.8	4.4
LD-SV-2686-E-0+45-025-L	E-03	3.4	
LD-SV-2685-E-0+45-025-L	E-03	3.4	3.4
LD-SV-2778-E-0+45-035-L	E-04	1.2	
LD-SV-2777-E-0+45-035-L	E-04	2.0	1.6
LD-SV-2791-E-0+45-045-L	E-05	2.4	
LD-SV-2792-E-0+45-045-L	E-05	1.4	1.9
LD-SV-2809-E-0+45-055-L	E-06	1.4	
LD-SV-2810-E-0+45-055-L	E-06	.8	1.1
LD-SV-2836-E-0+45-065-L	E-07	3.6	
LD-SV-2835-E-0+45-065-L	E-07	4.8	4.2
LD-SV-2834-E-0+45-075-L	E-08	3.4	
LD-SV-2833-E-0+45-075-L	E-08	4.4	3.9
LD-SV-2773-E-0+45-085-L	E-09	1.5	
LD-SV-2774-E-0+45-085-L	E-09	1.6	1.5
LD-SV-2232-E-0+45-095-L	E-10	.9	
LD-SV-2233-E-0+45-095-L	E-10	2.1	1.5
LD-SV-1734-E-0+45-105-L	E-11	3.9	
LD-SV-1733-E-0+45-105-L	E-11	4.0	4.0

(2271R)

SAMPLE ID	LOCATION	FINAL Ra-226	AVERAGE PER GRID
LD-SV-1749-E-0+45-115-L	E-12	3.1	
LD-SV-1750-E-0+45-115-L	E-12	3.2	3.2
LD-SV-1664-E-0+45-125-L	E-13	.8	
LD-SV-1665-E-0+45-125-L	E-13	1.5	1.1
LD-SV-1720-E-0+45-135-L	E-14	.4	
LD-SV-1719-E-0+45-135-L	E-14	4.6	2.5
LD-SV-0803-F-0+55-005-L	F-01	2.7	
LD-SV-0804-F-0+55-005-L	F-01	2.0	2.3
LD-SV-2467-F-0+55-015-L	F-02	3.6	
LD-SV-2468-F-0+55-015-L	F-02	2.9	3.2
LD-SV-0740-F-0+55-025-L	F-03	4.7	
LD-SV-0739-F-0+55-025-L	F-03	4.0	4.3
LD-SV-2752-F-0+55-035-L	F-04	2.2	
LD-SV-2751-F-0+55-035-L	F-04	1.5	1.9
LD-SV-2776-F-0+55-045-L	F-05	2.0	
LD-SV-2775-F-0+55-045-L	F-05	2.0	2.0
LD-SV-2816-F-0+55-055-L	F-06	5.2	
LD-SV-2815-F-0+55-055-L	F-06	.8	3.0
LD-SV-2845-F-0+55-065-L	F-07	3.0	
LD-SV-2846-F-0+55-065-L	F-07	2.7	2.8
LD-SV-2470-F-0+55-075-L	F-08	5.9	
LD-SV-2469-F-0+55-075-L	F-08	4.2	5.1
LD-SV-2635-F-0+55-085-L	F-09	1.3	
LD-SV-2636-F-0+55-085-L	F-09	-	1.3
LD-SV-2472-F-0+55-095-L	F-10	2.6	
LD-SV-2471-F-0+55-095-L	F-10	.8	1.7
LD-SV-2571-F-0+55-105-L	F-11	2.2	
LD-SV-2572-F-0+55-105-L	F-11	3.6	2.9
LD-SV-1668-F-0+55-115-L	F-12	1.8	
LD-SV-1669-F-0+55-115-L	F-12	2.3	2.0
LD-SV-1760-F-0+55-125-L	F-13	2.8	
LD-SV-1759-F-0+55-125-L	F-13	2.8	2.8
LD-SV-1680-F-0+55-135-L	F-14	1.9	
LD-SV-1681-F-0+55-135-L	F-14	1.9	1.9
LD-SV-1683-F-0+55-145-L	F-15	2.9	
LD-SV-1682-F-0+55-145-L	F-15	2.4	2.7
LD-SV-0798-G-0+65-005-L	G-01	2.8	
LD-SV-0736-G-0+65-005-L	G-01	2.8	2.8
LD-SV-0762-G-0+65-015-L	G-02	2.0	
LD-SV-0763-G-0+65-015-L	G-02	4.6	3.3
LD-SV-2670-G-0+65-025-L	G-03	2.3	
LD-SV-2669-G-0+65-025-L	G-03	1.7	2.0
LD-SV-2759-G-0+65-035-L	G-04	2.0	
LD-SV-2760-G-0+65-035-L	G-04	2.2	2.1
LD-SV-2770-G-0+65-045-L	G-05	1.6	
LD-SV-2769-G-0+65-045-L	G-05	1.3	1.4
LD-SV-2802-G-0+65-055-L	G-06	2.3	

(2271R)

SAMPLE ID	LOCATION	FINAL Ra-226	AVERAGE PER GRID
LD-SV-2801-G-0+65-055-L	G-06	3.4	2.8
LD-SV-2842-G-0+65-065-L	G-07	3.1	
LD-SV-2841-G-0+65-065-L	G-07	3.3	3.2
LD-SV-2817-G-0+65-075-L	G-08	1.5	
LD-SV-2818-G-0+65-075-L	G-08	4.0	2.7
LD-SV-2242-G-0+65-085-L	G-09	2.2	
LD-SV-2243-G-0+65-085-L	G-09	1.1	1.6
LD-SV-2586-G-0+65-095-L	G-10	2.0	
LD-SV-2258-G-0+65-095-L	G-10	1.1	1.6
LD-SV-2555-G-0+65-105-L	G-11	1.9	
LD-SV-2556-G-0+65-105-L	G-11	1.1	1.5
LD-SV-2667-G-0+65-115-L	G-12	.7	
LD-SV-2668-G-0+65-115-L	G-12	1.2	0.9
LD-SV-1710-G-0+65-125-L	G-13	1.6	
LD-SV-1709-G-0+65-125-L	G-13	1.9	1.8
LD-SV-1687-G-0+65-135-L	G-14	3.1	
LD-SV-1688-G-0+65-135-L	G-14	4.1	3.6
LD-SV-1754-G-0+65-145-L	G-15	3.8	
LD-SV-1753-G-0+65-145-L	G-15	4.0	3.9
LD-SV-0771-H-0+75-005-L	H-01	3.1	
LD-SV-0770-H-0+75-005-L	H-01	3.2	3.2
LD-SV-0761-H-0+75-015-L	H-02	2.3	
LD-SV-0760-H-0+75-015-L	H-02	3.2	2.7
LD-SV-0738-H-0+75-025-L	H-03	2.3	
LD-SV-0737-H-0+75-025-L	H-03	1.8	2.0
LD-SV-2757-H-0+75-035-L	H-04	2.2	
LD-SV-2758-H-0+75-035-L	H-04	1.6	1.9
LD-SV-2781-H-0+75-045-L	H-05	1.9	
LD-SV-2782-H-0+75-045-L	H-05	1.8	1.9
LD-SV-2814-H-0+75-055-L	H-06	3.8	
LD-SV-2813-H-0+75-055-L	H-06	.8	2.3
LD-SV-2839-H-0+75-065-L	H-07	2.2	
LD-SV-2840-H-0+75-065-L	H-07	2.7	2.5
LD-SV-2828-H-0+75-075-L	H-08	2.5	
LD-SV-2827-H-0+75-075-L	H-08	3.6	3.0
LD-SV-2227-H-0+75-085-L	H-09	1.4	
LD-SV-2226-H-0+75-085-L	H-09	.6	1.0
LD-SV-2570-H-0+75-095-L	H-10	3.4	
LD-SV-2569-H-0+75-095-L	H-10	1.2	2.3
LD-SV-2577-H-0+75-105-L	H-11	1.3	
LD-SV-2578-H-0+75-105-L	H-11	1.6	1.5
LD-SV-2676-H-0+75-115-L	H-12	.7	
LD-SV-2675-H-0+75-115-L	H-12	.7	0.7
LD-SV-2474-H-0+75-125-L	H-13	1.6	
LD-SV-2473-H-0+75-125-L	H-13	1.0	1.3
LD-SV-2475-H-0+75-135-L	H-14	1.9	
LD-SV-2476-H-0+75-135-L	H-14	3.4	2.7

(2271R)

SAMPLE ID	LOCATION	FINAL Ra-226	AVERAGE PER GRID
LD-SV-1711-H-0+75-145-L	H-15	3.6	
LD-SV-1712-H-0+75-145-L	H-15	3.2	3.4
LD-SV-0755-J-0+85-005-L	J-01	2.4	
LD-SV-0756-J-0+85-005-L	J-01	5.4	3.9
LD-SV-0759-J-0+85-015-L	J-02	2.4	
LD-SV-0777-J-0+85-015-L	J-02	4.9	3.7
LD-SV-0778-J-0+85-025-L	J-03	4.1	
LD-SV-0779-J-0+85-025-L	J-03	3.8	4.0
LD-SV-2483-J-0+85-035-L	J-04	2.6	
LD-SV-2484-J-0+85-035-L	J-04	4.3	3.5
LD-SV-2763-J-0+85-045-L	J-05	1.6	
LD-SV-2764-J-0+85-045-L	J-05	3.6	2.6
LD-SV-2803-J-0+85-055-L	J-06	1.2	
LD-SV-2804-J-0+85-055-L	J-06	1.8	1.5
LD-SV-2849-J-0+85-065-L	J-07	1.5	
LD-SV-2850-J-0+85-065-L	J-07	1.5	1.5
LD-SV-2823-J-0+85-075-L	J-08	1.4	
LD-SV-2824-J-0+85-075-L	J-08	1.5	1.5
LD-SV-2224-J-0+85-085-L	J-09	2.1	
LD-SV-2225-J-0+85-085-L	J-09	.03	1.1
LD-SV-2557-J-0+85-095-L	J-10	1.2	
LD-SV-2558-J-0+85-095-L	J-10	.8	1.0
LD-SV-2671-J-0+85-105-L	J-11	1.0	
LD-SV-2672-J-0+85-105-L	J-11	.9	0.9
LD-SV-2589-J-0+85-115-L	J-12	.5	
LD-SV-2590-J-0+85-115-L	J-12	1.7	1.1
LD-SV-2477-J-0+85-125-L	J-13	1.4	
LD-SV-2478-J-0+85-125-L	J-13	2.4	1.9
LD-SV-2479-J-0+85-135-L	J-14	1.4	
LD-SV-2480-J-0+85-135-L	J-14	1.9	1.6
LD-SV-2481-J-0+85-145-L	J-15	3.6	
LD-SV-2482-J-0+85-145-L	J-15	=	3.6
LD-SV-0782-K-0+95-005-L	K-01	4.8	
LD-SV-0783-K-0+95-005-L	K-01	5.6	5.2
LD-SV-2679-K-0+95-015-L	K-02	1.9	
LD-SV-2680-K-0+95-015-L	K-02	3.8	2.8
LD-SV-0789-K-0+95-025-L	K-03	5.5	
LD-SV-0790-K-0+95-025-L	K-03	4.7	5.1
LD-SV-0784-K-0+95-035-L	K-04	3.3	
LD-SV-0785-K-0+95-035-L	K-04	3.3	3.3
LD-SV-2753-K-0+95-045-L	K-05	3.7	
LD-SV-2754-K-0+95-045-L	K-05	3.8	3.8
LD-SV-2805-K-0+95-055-L	K-06	2.9	
LD-SV-2806-K-0+95-055-L	K-06	1.8	2.3
LD-SV-2847-K-0+95-065-L	K-07	2.4	
LD-SV-2848-K-0+95-065-L	K-07	3.1	2.7
LD-SV-2799-K-0+95-075-L	K-08	--	

(2271R)

SAMPLE ID	LOCATION	FINAL Ra-226	AVERAGE PER GRID
LD-SV-2800-K-0+95-075-L	K-08	1.4	1.4
LD-SV-2240-K-0+95-085-L	K-09	1.4	
LD-SV-2241-K-0+95-085-L	K-09	1.8	1.6
LD-SV-2587-K-0+95-095-L	K-10	1.5	
LD-SV-2588-K-0+95-095-L	K-10	1.2	1.4
LD-SV-2573-K-0+95-105-L	K-11	.9	
LD-SV-2696-K-0+95-105-L	K-11	1.4	1.1
LD-SV-2687-K-0+95-115-L	K-12	.9	
LD-SV-2688-K-0+95-115-L	K-12	1.3	1.1
LD-SV-2485-K-0+95-125-L	K-13	.9	
LD-SV-2486-K-0+95-125-L	K-13	1.5	1.2
LD-SV-2529-K-0+95-135-L	K-14	1.9	
LD-SV-2530-K-0+95-135-L	K-14	3.0	2.5
LD-SV-2487-K-0+95-145-L	K-15	3.4	
LD-SV-2488-K-0+95-145-L	K-15	4.2	3.8
LD-SV-0780-L-1+05-005-L	L-01	6.2	
LD-SV-0781-L-1+05-005-L	L-01	5.9	6.1
LD-SV-0816-L-1+05-015-L	L-02	5.1	
LD-SV-0817-L-1+05-015-L	L-02	4.6	4.8
LD-SV-0792-L-1+05-025-L	L-03	3.7	
LD-SV-0794-L-1+05-025-L	L-03	4.6	4.2
LD-SV-0791-L-1+05-035-L	L-04	4.3	
LD-SV-0793-L-1+05-035-L	L-04	4.7	4.5
LD-SV-2503-L-1+05-045-L	L-05	2.5	
LD-SV-2504-L-1+05-045-L	L-05	2.6	2.5
LD-SV-2489-L-1+05-055-L	L-06	1.9	
LD-SV-2490-L-1+05-055-L	L-06	1.2	1.5
LD-SV-2527-L-1+05-065-L	L-07	1.9	
LD-SV-2528-L-1+05-065-L	L-07	2.1	2.0
LD-SV-2609-L-1+05-075-L	L-08	.5	
LD-SV-2610-L-1+05-075-L	L-08	1.0	0.8
LD-SV-2619-L-1+05-085-L	L-09	2.0	
LD-SV-2620-L-1+05-085-L	L-09	1.7	1.9
LD-SV-2645-L-1+05-095-L	L-10	4.7	
LD-SV-2646-L-1+05-095-L	L-10	2.7	3.7
LD-SV-2647-L-1+05-105-L	L-11	2.3	
LD-SV-2648-L-1+05-105-L	L-11	-	2.3
LD-SV-2611-L-1+05-115-L	L-12	1.3	
LD-SV-2612-L-1+05-115-L	L-12	2.4	1.9
LD-SV-2493-L-1+05-125-L	L-13	2.2	
LD-SV-2494-L-1+05-125-L	L-13	1.9	2.0
LD-SV-2525-L-1+05-135-L	L-14	2.2	
LD-SV-2526-L-1+05-135-L	L-14	4.6	3.4
LD-SV-2543-L-1+05-145-L	L-15	3.9	
LD-SV-2544-L-1+05-145-L	L-15	3.4	3.7

(2271R)

SAMPLE ID	LOCATION	FINAL Ra-226	AVERAGE PER GRID
LD-SV-0813-M-1+15-005-L	M-01	3.0	
LD-SV-0814-M-1+15-005-L	M-01	3.2	3.1
LD-SV-2509-M-1+15-015-L	M-02	6.4	
LD-SV-2510-M-1+15-015-L	M-02	6.2	6.3
LD-SV-0665-M-1+15-025-L	M-03	6.0	
LD-SV-0823-M-1+15-025-L	M-03	4.6	5.3
LD-SV-0663-M-1+15-035-L	M-04	3.2	
LD-SV-0669-M-1+15-035-L	M-04	4.4	3.8
LD-SV-2494-M-1+15-045-L	M-05	3.5	
LD-SV-2496-M-1+15-045-L	M-05	3.8	3.7
LD-SV-2491-M-1+15-055-L	M-06	3.7	
LD-SV-2864-M-1+15-055-L	M-06	4.0	3.8
LD-SV-2545-M-1+15-065-L	M-07	6.4	
LD-SV-2546-M-1+15-065-L	M-07	4.8	5.6
LD-SV-2663-M-1+15-075-L	M-08	1.5	
LD-SV-2664-M-1+15-075-L	M-08	.8	1.1
LD-SV-2607-M-1+15-085-L	M-09	1.3	
LD-SV-2608-M-1+15-085-L	M-09	1.8	1.5
LD-SV-2650-M-1+15-095-L	M-10	2.4	
LD-SV-2649-M-1+15-095-L	M-10	2.7	2.5
LD-SV-2657-M-1+15-105-L	M-11	2.2	
LD-SV-2658-M-1+15-105-L	M-11	2.3	2.2
LD-SV-2677-M-1+15-115-L	M-12	2.9	
LD-SV-2678-M-1+15-115-L	M-12	2.2	2.5
LD-SV-2497-M-1+15-125-L	M-13	2.7	
LD-SV-2498-M-1+15-125-L	M-13	2.5	2.6
LD-SV-2523-M-1+15-135-L	M-14	4.4	
LD-SV-2524-M-1+15-135-L	M-14	=	4.4
LD-SV-2540-M-1+15-145-L	M-15	3.0	
LD-SV-2539-M-1+15-145-L	M-15	3.5	3.2
LD-SV-0766-N-1+25-005-L	N-01	3.6	
LD-SV-0767-N-1+25-005-L	N-01	4.5	4.1
LD-SV-0659-N-1+25-015-L	N-02	4.2	
LD-SV-0660-N-1+25-015-L	N-02	2.5	3.3
LD-SV-0655-N-1+25-025-L	N-03	3.4	
LD-SV-0656-N-1+25-025-L	N-03	4.3	3.8
LD-SV-0650-N-1+25-035-L	N-04	5.6	
LD-SV-0653-N-1+25-035-L	N-04	6.2	5.9
LD-SV-2501-N-1+25-045-L	N-05	3.6	
LD-SV-2502-N-1+25-045-L	N-05	3.0	3.3
LD-SV-2522-N-1+25-055-L	N-06	3.2	
LD-SV-2521-N-1+25-055-L	N-06	4.0	3.6
LD-SV-2506-N-1+25-065-L	N-07	1.6	
LD-SV-2505 N-1+25-065-L	N-07	3.0	2.3
LD-SV-2613-N-1+25-075-L	N-08	1.3	
LD-SV-2614-N-1+25-075-L	N-08	1.7	1.5
LD-SV-2621-N-1+25-085-L	N-09	2.0	
LD-SV-2622-N-1+25-085-L	N-09	1.5	1.7

(2271R)

SAMPLE ID	LOCATION	FINAL Ra-226	AVERAGE PER GRID
LD-SV-2655-N-1+25-095-L	N-10	1.2	
LD-SV-2656-N-1+25-095-L	N-10	2.3	1.7
LD-SV-2651-N-1+25-105-L	N-11	2.3	
LD-SV-2652-N-1+25-105-L	N-11	1.8	2.0
LD-SV-2683-N-1+25-115-L	N-12	3.2	
LD-SV-2684-N-1+25-115-L	N-12	2.9	3.0
LD-SV-2499-N-1+25-125-L	N-13	2.6	
LD-SV-2500-N-1+25-125-L	N-13	2.8	2.7
LD-SV-2512-N-1+25-135-L	N-14	3.2	
LD-SV-2511-N-1+25-135-L	N-14	3.8	3.5
LD-SV-2517-N-1+25-145-L	N-15	2.4	
LD-SV-2518-N-1+25-145-L	N-15	3.1	2.7
LD-SV-0825-P-1+35-005-L	P-01	4.0	
LD-SV-0824-P-1+35-005-L	P-01	3.5	3.8
LD-SV-0649-P-1+35-015-L	P-02	4.8	
LD-SV-0647-P-1+35-015-L	P-02	-	4.8
LD-SV-0645-P-1+35-025-L	P-03	2.4	
LD-SV-0646-P-1+35-025-L	P-03	3.3	2.8
LD-SV-0643-P-1+35-035-L	P-04	2.7	
LD-SV-0644-P-1+35-035-L	P-04	3.2	3.0
LD-SV-2552-P-1+35-045-L	P-05	1.6	
LD-SV-2551-P-1+35-045-L	P-05	2.0	1.8
LD-SV-2542-P-1+35-055-L	P-06	1.9	
LD-SV-2541-P-1+35-055-L	P-06	2.0	2.0
LD-SV-2533-P-1+35-065-L	P-07	2.6	
LD-SV-2534-P-1+35-065-L	P-07	2.7	2.7
LD-SV-2617-P-1+35-075-L	P-08	2.2	
LD-SV-2618-P-1+35-075-L	P-08	3.3	2.7
LD-SV-2653-P-1+35-085-L	P-09	2.3	
LD-SV-2654-P-1+35-085-L	P-09	2.5	2.4
LD-SV-2661-P-1+35-095-L	P-10	3.3	
LD-SV-2662-P-1+35-095-L	P-10	2.7	3.0
LD-SV-2625-P-1+35-105-L	P-11	2.9	
LD-SV-2626-P-1+35-105-L	P-11	1.6	2.2
LD-SV-2631-P-1+35-115-L	P-12	3.1	
LD-SV-2632-P-1+35-115-L	P-12	3.4	3.2
LD-SV-2547-P-1+35-125-L	P-13	2.2	
LD-SV-2548-P-1+35-125-L	P-13	2.7	2.5
LD-SV-2513-P-1+35-135-L	P-14	2.3	
LD-SV-2514-P-1+34-135-L	P-14	3.1	2.7
LD-SV-2520-P-1+35-145-L	P-15	3.2	
LD-SV-2519-P-1+35-145-L	P-15	2.9	3.0

(2271R)

SAMPLE ID	LOCATION	FINAL Ra-226	AVERAGE PER GRID
LD-SV-0826-R-1+45-005-L	R-01	4.6	
LD-SV-0827-R-1+45-005-L	R-01	3.0	3.8
LD-SV-2549-R-1+45-045-L	R-05	2.0	
LD-SV-2550-R-1+45-045-L	R-05	2.5	2.2
LD-SV-2532-R-1+45-055-L	R-06	2.1	
LD-SV-2531-R-1+45-055-L	R-06	3.9	3.0
LD-SV-2507-R-1+45-065-L	R-07	2.1	
LD-SV-2508-R-1+45-065-L	R-07	1.7	1.9
LD-SV-2628-R-1+45-075-L	R-08	2.6	2.6
LD-SV-2659-R-1+45-085-L	R-09	2.6	
LD-SV-2660-R-1+45-085-L	R-09	2.0	2.3
LD-SV-2623-R-1+45-095-L	R-10	2.7	
LD-SV-2624-R-1+45-095-L	R-10	3.1	2.9
LD-SV-2615-R-1+45-105-L	R-11	2.0	
LD-SV-2616-R-1+45-105-L	R-11	-	2.0
LD-SV-2666-R-1+45-115-L	R-12	2.4	
LD-SV-2665-R-1+45-115-L	R-12	2.3	2.3
LD-SV-2537-R-1+45-125-L	R-13	3.2	
LD-SV-2538-R-1+45-125-L	R-13	3.2	3.2
LD-SV-2535-R-1+45-135-L	R-14	4.2	
LD-SV-2536-R-1+45-135-L	R-14	4.3	4.2
LD-SV-2515-R-1+45-145-L	R-15	3.1	
LD-SV-2516-R-1+45-145-L	R-15	3.5	3.3
LD-SV-2913-S-1+55-065-L	S-07	2.8	
LD-SV-2914-S-1+55-065-L	S-07	3.2	3.0
LD-SV-2915-S-1+55-075-L	S-08	3.5	
LD-SV-2916-S-1+55-075-L	S-08	3.4	3.5
LD-SV-2911-S-1+55-085-L	S-09	2.3	
LD-SV-2912-S-1+55-085-L	S-09	3.8	3.0
LD-SV-2919-S-1+55-095-L	S-10	3.3	
LD-SV-2920-S-1+55-095-L	S-10	3.1	3.2
LD-SV-2925-S-1+55-105-L	S-11	3.8	
LD-SV-2926-S-1+55-105-L	S-11	3.8	3.8
LD-SV-2923-S-1+55-115-L	S-12	3.4	
LD-SV-2924-S-1+55-115-L	S-12	3.2	3.3
LD-SV-2917-T-1+65-065-L	T-07	3.8	
LD-SV-2918-T-1+65-065-L	T-07	1.7	2.7
LD-SV-2921-T-1+65-085-L	T-09	5.1	
LD-SV-2922-T-1+65-085-L	T-09	.9	3.0
LD-SV-2409-U-1+75-045-L	U-05	4.6	
LD-SV-2410-U-1+75-045-L	U-05	3.7	4.2
LD-SV-2407-U-1+75-055-L	U-06	2.3	
LD-SV-2408-U-1+75-055-L	U-06	3.2	2.7
LD-SV-2399-U-1+75-065-L	U-07	1.8	
LD-SV-2400-U-1+75-065-L	U-07	2.6	2.2
LD-SV-2397-U-1+75-075-L	U-08	4.4	

(2271R)

SAMPLE ID	LOCATION	FINAL Ra-226	AVERAGE PER GRID
LD-SV-2398-U-1+75-075-L	U-08	4.5	4.4
LD-SV-2267-U-1+75-085-L	U-09	4.1	
LD-SV-2268-U-1+75-085-L	U-09	5.6	4.8
LD-SV-2259-U-1+75-095-L	U-10	6.1	
LD-SV-2260-U-1+75-095-L	U-10	6.2	6.2
LD-SV-2401-U-1+75-105-L	U-11	4.5	
LD-SV-2402-U-1+75-105-L	U-11	3.9	4.2
LD-SV-2387-U-1+75-115-L	U-12	2.1	
LD-SV-2388-U-1+75-115-L	U-12	1.9	2.0
LD-SV-2389-U-1+75-125-L	U-13	3.6	
LD-SV-2390-U-1+75-125-L	U-13	3.6	3.6
LD-SV-2164-U-1+75-135-L	U-14	2.4	
LD-SV-2165-U-1+75-135-L	U-14	2.5	2.5
LD-SV-2294-U-1+75-145-L	U-15	3.5	
LD-SV-2295-U-1+75-145-L	U-15	2.6	3.0
LD-SV-2290-U-1+75-155-L	U-16	1.9	
LD-SV-2291-U-1+75-155-L	U-16	2.0	2.0
LD-SV-2288-U-1+75-165-L	U-17	2.4	
LD-SV-2289-U-1+75-165-L	U-17	3.0	2.7
LD-SV-2067-U-1+75-175-L	U-18	3.3	
LD-SV-2068-U-1+75-175-L	U-18	1.9	2.6
LD-SV-2301-V-1+85-185-L	V-19	.9	
LD-SV-2302-V-1+85-185-L	V-19	1.5	1.2
LD-SV-2329-V-1+85-195-L	V-20	1.5	
LD-SV-2330-V-1+85-195-L	V-20	2.4	2.0
LD-SV-2331-V-1+85-205-L	V-21	1.7	
LD-SV-2332-V-1+85-205-L	V-21	1.9	1.8
LD-SV-2333-V-1+85-215-L	V-22	2.4	
LD-SV-2334-V-1+85-215-L	V-22	2.9	2.7
LD-SV-2336-V-1+75-225-L	V-23	3.0	
LD-SV-2337-V-1+75-225-L	V-23	3.0	3.0
LD-SV-2338-V-1+85-235-L	V-24	1.7	
LD-SV-2339-V-1+85-235-L	V-24	3.5	2.6
LD-SV-2345-V-1+85-245-L	V-25	2.5	
LD-SV-2346-V-1+85-245-L	V-25	1.3	1.9
LD-SV-2342-V-1+85-255-L	V-26	2.6	
LD-SV-2343-V-1+85-255-L	V-26	2.6	2.6
LD-SV-2349-V-1+85-265-L	V-27	1.2	
LD-SV-2350-V-1+85-265-L	V-27	1.2	1.2
LD-SV-2351-V-1+85-275-L	V-28	.8	
LD-SV-2352-V-1+85-275-L	V-28	1.2	1.0
LD-SV-2353-V-1+85-285-L	V-29	3.4	
LD-SV-2354-V-1+85-285-L	V-29	2.0	2.7
LD-SV-1921-V-1+85-295-L	V-30	.6	

(2271R)

SAMPLE ID	LOCATION	FINAL Ra-226	AVERAGE PER GRID
LD-SV-2999-AA-0+05-05-R	AA-01	-	
LD-SV-3000-AA-0+05-05-R	AA-01	2.6	2.6
LD-SV-3011-AB-0+15-05-R	AB-01	5.4	
LD-SV-3012-AB-0+15-05-R	AB-01	1.9	2.8
LD-SV-3013-AC-0+25-05-R	AC-01	2.4	
LD-SV-3014-AC-0+25-05-R	AC-01	5.0	3.7
LD-SV-3021-AE-0+45-05-R	AE-01	-	
LD-SV-3022-AE-0+45-05-R	AE-01	4.6	4.6
LD-SV-2997-AF-0+55-05-R	AF-01	-	
LD-SV-2998-AF-0+55-05-R	AF-01	2.0	2.0
LD-SV-3005-AG-0+65-05-R	AG-01	-	
LD-SV-3006-AG-0+65-05-R	AG-01	5.8	5.8
LD-SV-3007-AH-0+75-05-R	AH-01	-	
LD-SV-3008-AH-0+75-05-R	AH-01	4.9	4.9
LD-SV-2461-AS-1+55-05-R	AS-01	4.8	
LD-SV-2462-AS-1+55-05-R	AS-01	4.7	4.7
LD-SV-2463-AS-1+55-15-R	AS-02	4.7	
LD-SV-2464-AS-1+55-15-R	AS-02	4.1	4.4
LD-SV-2448-AS-1+55-65-R	AS-07	4.2	
LD-SV-2449-AS-1+55-65-R	AS-07	4.9	4.6
LD-SV-2581-BA-0-05-05-R	BA-01	2.4	
LD-SV-2582-BA-0-05-05-R	BA-01	1.5	2.0
LD-SV-2583-BA-0-05-15-R	BA-02	1.5	
LD-SV-2584-BA-0-05-15-R	BA-02	1.8	1.6
LD-SV-2565-BB-0-15-05-R	BB-01	1.2	
LD-SV-2566-BB-0-15-05-R	BB-01	1.4	1.3
LD-SV-2575-BB-0-15-15-R	BB-02	.7	
LD-SV-2576-BB-0-15-15-R	BB-02	1.7	1.2
LD-SV-2567-BC-0-25-05-R	BC-01	1.5	
LD-SV-2568-BC-0-25-05-R	BC-01	1.5	1.5
LD-SV-2591-BC-0-25-15-R	BC-02	2.5	
LD-SV-2592-BC-0-25-15-R	BC-02	2.2	2.3
LD-SV-2563-BD-0-35-05-R	BD-01	4.2	
LD-SV-2564-BD-0-35-05-R	BD-01	3.2	3.7
LD-SV-2877-BE-0-45-05-R	BE-01	2.0	
LD-SV-2878-BE-0-45-05-R	BE-01	-	2.0
LD-SV-2309-CA-0-05-005-L	CA-01	1.0	
LD-SV-2310-CA-0-05-005-L	CA-01	1.6	1.3
LD-SV-2315-CA-0-05-015-L	CA-02	2.9	
LD-SV-2316-CA-0-05-015-L	CA-02	2.1	2.5
LD-SV-2737-CA-0-05-025-L	CA-03	4.8	
LD-SV-2738-CA-0-05-025-L	CA-03	4.1	4.4
LD-SV-2733-CA-0-05-035-L	CA-04	5.0	
LD-SV-2734-CA-0-05-035-L	CA-04	1.5	3.2
LD-SV-2579-CA-0-05-045-L	CA-05	3.5	
LD-SV-2580-CA-0-05-045-L	CA-05	3.7	3.6
LD-SV-2553-CA-0-05-055-L	CA-06	6.2	
LD-SV-2554-CA-0-05-055-L	CA-06	4.4	5.3

(2271R)

SAMPLE ID	LOCATION	FINAL Ra-226	AVERAGE PER GRID
LD-SV-2605-CA-0-05-065-L	CA-07	3.5	
LD-SV-2606-CA-0-05-065-L	CA-07	3.2	3.3
LD-SV-2597-CA-0-05-075-L	CA-08	5.5	
LD-SV-2598-CA-0-05-075-L	CA-08	5.0	5.2
LD-SV-2641-CA-0-05-105-L	CA-11	1.4	
LD-SV-2642-CA-0-05-105-L	CA-11	2.2	1.8
LD-SV-2526-CA-0-05-115-L	CA-12	1.7	
LD-SV-2595-CA-0-05-115-L	CA-12	3.7	2.7
LD-SV-2311-CB-0-15-005-L	CB-01	1.3	
LD-SV-2312-CB-0-15-005-L	CB-01	1.1	1.2
LD-SV-2319-CB-0-15-015-L	CB-02	1.5	
LD-SV-2320-CB-0-15-015-L	CB-02	1.6	1.5
LD-SV-2743-CB-0-15-025-L	CB-03	1.8	
LD-SV-2744-CB-0-15-025-L	CB-03	2.3	2.0
LD-SV-2701-CB-0-15-035-L	CB-04	1.5	
LD-SV-2702-CB-0-15-035-L	CB-04	.8	1.1
LD-SV-2703-CB-0-15-045-L	CB-05	1.3	
LD-SV-2704-CB-0-15-045-L	CB-05	1.4	1.4
LD-SV-2705-CB-0-15-055-L	CB-06	1.0	
LD-SV-2706-CB-0-15-055-L	CB-06	1.5	1.3
LD-SV-2707-CB-0-15-065-L	CB-07	1.7	
LD-SV-2880-CB-0-15-065-L	CB-07	1.4	1.5
LD-SV-2709-CB-0-15-075-L	CB-08	3.6	
LD-SV-2710-CB-0-15-075-L	CB-08	3.5	3.5
LD-SV-2711-CB-0-15-085-L	CB-09	2.4	
LD-SV-2712-CB-0-15-085-L	CB-09	2.4	2.4
LD-SV-2713-CB-0-15-095-L	CB-10	3.5	
LD-SV-2714-CB-0-15-095-L	CB-10	1.6	2.5
LD-SV-2735-CB-0-15-105-L	CB-11	4.3	
LD-SV-2736-CB-0-15-105-L	CB-11	4.3	4.3
LD-SV-2593-CB-0-15-115-L	CB-12	4.0	
LD-SV-2594-CB-0-15-115-L	CB-12	3.5	3.8
LD-SV-2317-CC-0-25-005-L	CC-01	1.7	
LD-SV-2318-CC-0-25-005-L	CC-01	.4	1.0
LD-SV-2739-CC-0-25-015-L	CC-02	2.5	
LD-SV-2740-CC-0-25-015-L	CC-02	1.2	1.9
LD-SV-2882-CC-0-25-025-L	CC-03	2.5	
LD-SV-2884-CC-0-25-025-L	CC-03	3.0	2.7
LD-SV-2723-CC-0-25-035-L	CC-04	1.4	
LD-SV-2724-CC-0-25-035-L	CC-04	2.3	1.9
LD-SV-2731-CD-0-35-005-L	CD-01	5.1	
LD-SV-2732-CD-0-35-005-L	CD-01	4.2	4.7
LD-SV-2561-CD-0-35-015-L	CD-02	.4	
LD-SV-2562-CD-0-35-015-L	CD-02	1.8	1.1
LD-SV-2881-CD-0-35-025-L	CD-03	.7	
LD-SV-2882-CD-0-35-025-L	CD-03	.7	0.7
LD-SV-2689-CD-0-35-035-L	CD-04	1.7	
LD-SV-2690-CD-0-35-035-L	CD-04	2.3	2.0

(2271R)

SAMPLE ID	LOCATION	FINAL Ra-226	AVERAGE PER GRID
LD-SV-2741-CE-0-45-005-L	CE-01	.7	
LD-SV-2742-CE-0-45-005-L	CE-01	1.9	1.3
LD-SV-2603-GA-0-05-125-L	GA-01	2.7	
LD-SV-2604-GA-0-05-125-L	GA-01	3.2	3.0
LD-SV-2637-GA-0-05-135-L	GA-02	4.3	
LD-SV-2638-GA-0-05-135-L	GA-02	4.7	4.5
LD-SV-2643-GA-0-05-145-L	GA-03	4.3	
LD-SV-2644-GA-0-05-145-L	GA-03	2.2	3.2
LD-SV-2600-GA-0-05-155-L	GA-04	3.2	
LD-SV-2599-GA-0-05-155-L	GA-04	2.5	2.8
LD-SV-2640-GA-0-05-165-L	GA-05	2.5	
LD-SV-2639-GA-0-05-165-L	GA-05	2.2	2.3
LD-SV-1325-GA-0-05-175-L	GA-06	3.2	
LD-SV-1326-GA-0-05-175-L	GA-06	3.0	3.1
LD-SV-1324-GA-0-05-185-L	GA-07	3.2	
LD-SV-1323-GA-0-05-185-L	GA-07	2.9	3.0
LD-SV-2601-GA-0-05-195-L	GA-08	3.7	
LD-SV-2602-GA-0-05-195-L	GA-08	4.8	4.2
LD-SV-2698-GB-0-15-125-L	GB-01	2.9	
LD-SV-2697-GB-0-15-125-L	GB-01	2.6	2.7
LD-SV-2700-GB-0-15-135-L	GB-02	5.4	
LD-SV-2699-GB-0-15-135-L	GB-02	3.8	4.6
LD-SV-2719-GB-0-15-145-L	GB-03	5.1	
LD-SV-2720-GB-0-15-145-L	GB-03	4.1	4.6
LD-SV-2717-GB-0-15-155-L	GB-04	2.4	
LD-SV-2718-GB-0-15-155-L	GB-04	3.5	3.0
LD-SV-2716-GB-0-15-165-L	GB-05	2.8	
LD-SV-2715-GB-0-15-165-L	GB-05	3.3	3.0
LD-SV-2727-GB-0-15-175-L	GB-06	2.8	
LD-SV-2728-GB-0-15-175-L	GB-06	2.8	2.8
LD-SV-3019-KA-0+05-155-L	KA-01	-	
LD-SV-3020-KA-0+05-155-L	KA-01	2.4	1.2
LD-SV-2989-KA-0+05-165-L	KA-02	-	
LD-SV-2990-KA-0+05-165-L	KA-02	1.8	0.9
LD-SV-2992-KA-0+05-175-L	KA-03	3.7	
LD-SV-3016-KA-0+05-175-L	KA-03	4.9	4.3
LD-SV-2987-KB-0+15-155-L	KB-01	3.3	
LD-SV-2988-KB-0+15-155-L	KB-01	-	1.6
LD-SV-3003-KB-0+15-165-L	KB-02	-	
LD-SV-3004-KB-0+15-165-L	KB-02	6.0	3.0
LD-SV-3009-KC-0+25-155-L	KC-01	-	
LD-SV-3010-KC-0+25-155-L	KC-01	3.9	2.0
LD-SV-2993-KC-0+25-165-L	KC-02	-	
LD-SV-2994-KC-0+25-165-L	KC-02	6.6	3.3
LD-SV-2995-KD-0+35-155-L	KD-01	-	
LD-SV-2996-KD-0+35-155-L	KD-01	3.1	1.5
LD-SV-3017-KE-0+45-155-L	KE-01	-	
LD-SV-3018-KE-0+45-155-L	KE-01	3.9	2.0

(2271R)

APPENDIX 6-F

SUMMARY OF PHASE HAZARD ANALYSES AND HEALTH AND SAFETY TOPICS

APPENDIX 6-F

PHASE HAZARD ANALYSIS SUMMARY

FOR SOIL REMEDIATION

October 3, 1988, Project Phase: Sanitary Sewer Sample Collection, Summary: Project personnel collected, using nondestructive methods, radiological samples from the sanitary sewer manholes located on Stratford Avenue and Union Avenue to determine to extent of contamination associated with the sewer system.

November 11, 1988, Project Phase: Test Methodologies for Soil Excavation, Summary: Comparison of Argonne National Laboratory subsurface investigation procedures for radiological contamination against Chem-Nuclear iterative excavation methodology within a test plot on 105/107 East Stratford Avenue of approximately twenty feet by sixty feet.

November 17, 1988, Project Phase: Remediation of Contaminated Soil, 105/107 East Stratford Avenue Lot, Summary: The lot was divided into ten feet by ten feet grids. Each grid initially received an areal gamma grid survey to verify and document locations of gamma anomalies and to determine approximate depth contours associated with the subsurface contamination. Initial elevation points were then established for each grid in order to compare against final elevations after backfilling the excavated grids. Excavation was conducted using heavy equipment and manual methods with the contaminated soil placed directly into B-25 Boxes. Contaminated soil was removed to a depth where direct survey results indicated that the contamination was at or below 5 pCi/gram level. Verification soil samples were then collected and analyzed within the opposed crystal system.

December 6, 1988, Project Phase: Addendum Number 1, Remediation of Contaminated Soil, 105/107 East Stratford Avenue Lot, Summary: Respiratory protection during soil excavation was documented by Chem-Nuclear Systems, Inc. as not warranted during these activities and the U.S. Army Corps of Engineers approved the downgrade for the use of no respiratory protection. However, personnel within a six foot radius of the B-25 Box during tamping operations were directed by the U.S. Army Corps of Engineers to wear disposable dust masks to prevent mud and dirt splatter to their mouth and surrounding facial areas.

December 9, 1988, Project Phase: Exploratory Soil Testing for Radioactivity Levels, Summary: Argonne National Laboratory conducted a survey of the entire 105/107 East Stratford Avenue lot and surrounding private properties to determine the extent of subsurface radioactive contamination.

January 9, 1989, Project Phase: Addendum Number 2, Remediation

of Contaminated Soil, 105/107 East Stratford Avenue Lot, Summary: Safety procedures established for the removal of a 1,000 gallon underground heating oil storage tank located on the west side of the 105 East Stratford lot to include atmospheric sampling for explosive gas concentration, draining operations, and disposal.

February - March, 1989, Project Phase: Addendum Number 1 - 6, Sanitary Sewer Sample Collection, Summary: Argonne National Laboratory, using nondestructive methods, surveyed the sanitary sewer on East Stratford Avenue and North Union Avenue to include the associated manholes for radiological contamination. These surveys were conducted on February 17, 20, 21, 22, 23, and on March 10, 1989. The addendum to the Phase Hazard Analysis was used as a "Confined Space Entry Permit" for survey activities conducted on each of the above days.

March 1, 1989, Project Phase: U.S. Army Corps of Engineers Exploratory Soil Testing, Summary: Baltimore District under technical direction from Argonne National Laboratory conducted soil boring for subsurface radioactive contamination through the pavement on North Union Avenue to determine if Radium-226 concentration exceeded 5 pCi/gram above the local natural background concentration.

March 10, 1989, Project Phase: Stratford Avenue Sewer Line Replacement, Summary: A new eight inch vitrified clay sewer line was installed parallel to the existing East Stratford Avenue line, with the establishment of a new manhole.

SUMMARY OF TOOL BOX SAFETY DISCUSSIONS

FOR SOIL REMEDIATION

Topics Presented

1. Phase Hazard Analysis, Test Methodologies for Soil Excavation.
2. Standing Operating Procedures for Cold Stress Prevention.
3. Safe Work Practices for Soil Excavation.
4. Winter Driving Safety.
5. Safety Procedures for Entry into B-25 Boxes.
6. Safe Work Practices for Poclain Use.
7. Procedure for Obtaining Whole Body Counts.
8. Decontamination Responsibilities for Personal Clothing and Boots.
9. First Aid Services and Relocation of Aid Station.
10. Lansdowne Avenue Sewer Construction Activities.
11. Establishment of Clean Zones within the Control Area.
12. Safe Work Practices within the Control Area.
13. Safe Work Practices for Sewer Excavation Activities.
14. Exit Medical Examinations and Whole Body Counts.

APPENDIX 6-G

SITE MAPS

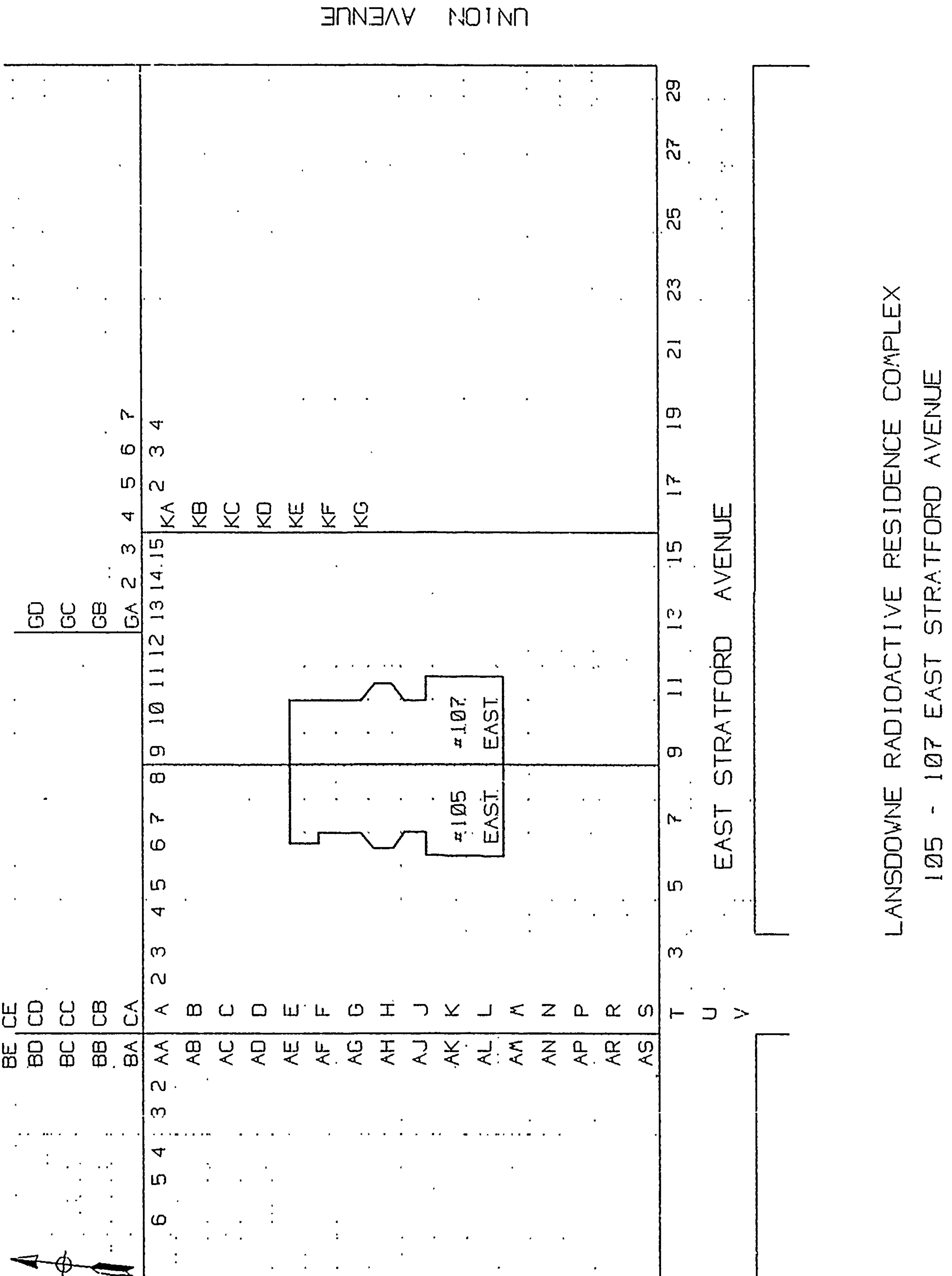


FIGURE S.1 SITE GRID LAYOUT

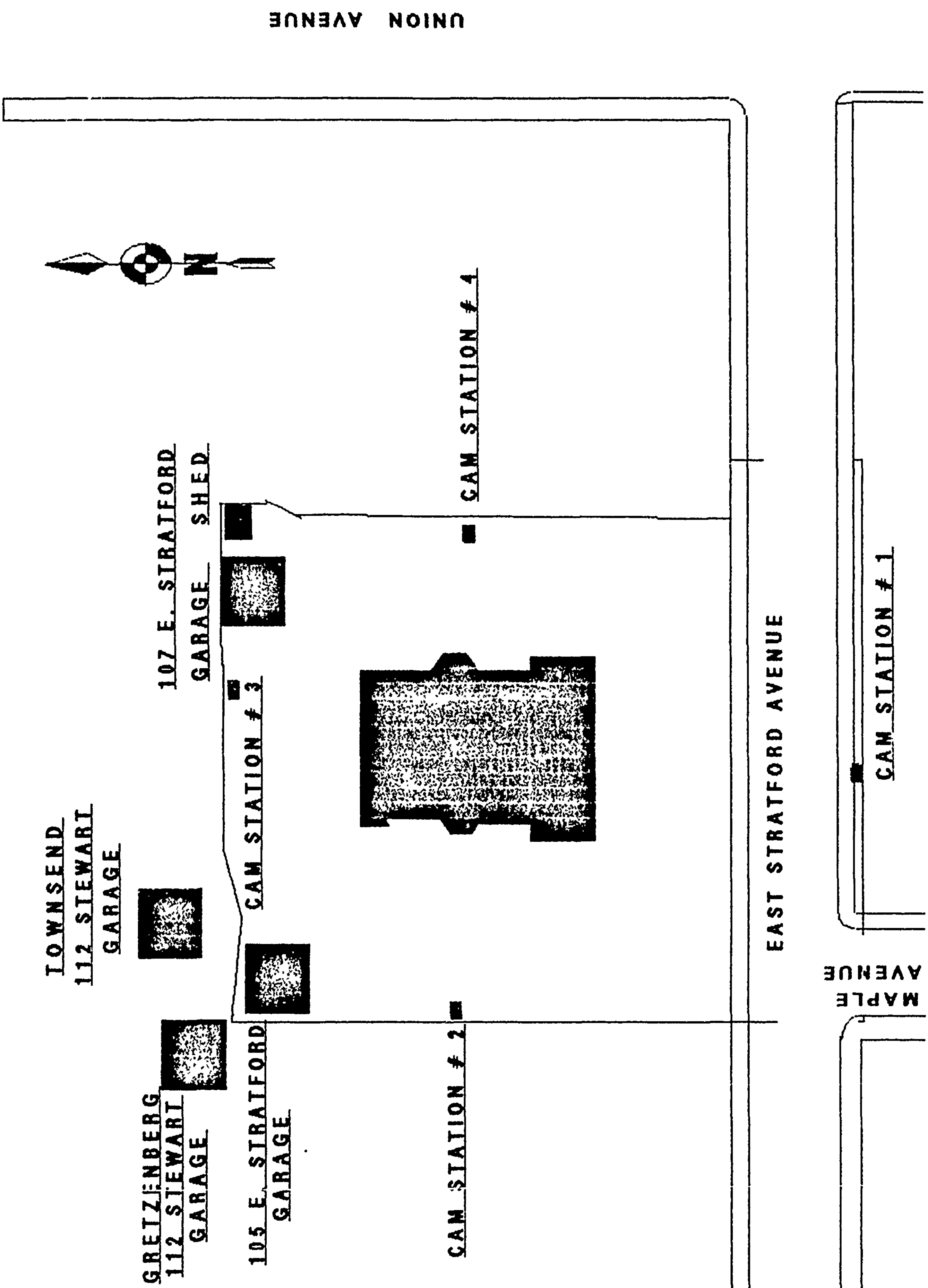


FIGURE S.2 LOCATION OF ENVIRONMENTAL CAM STATIONS

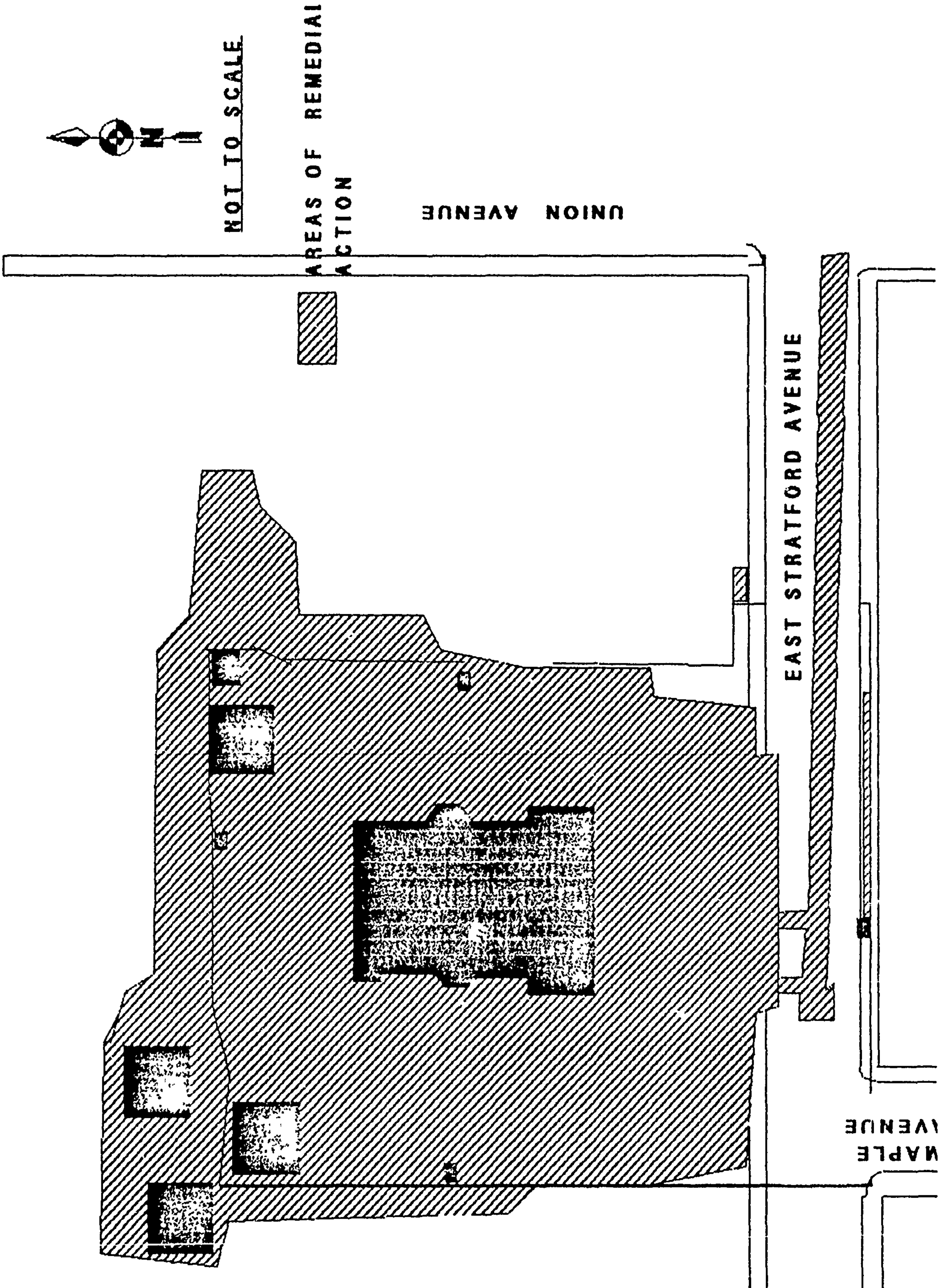


FIGURE S.3 AREAS OF SOIL EXCAVATION

6-G-343

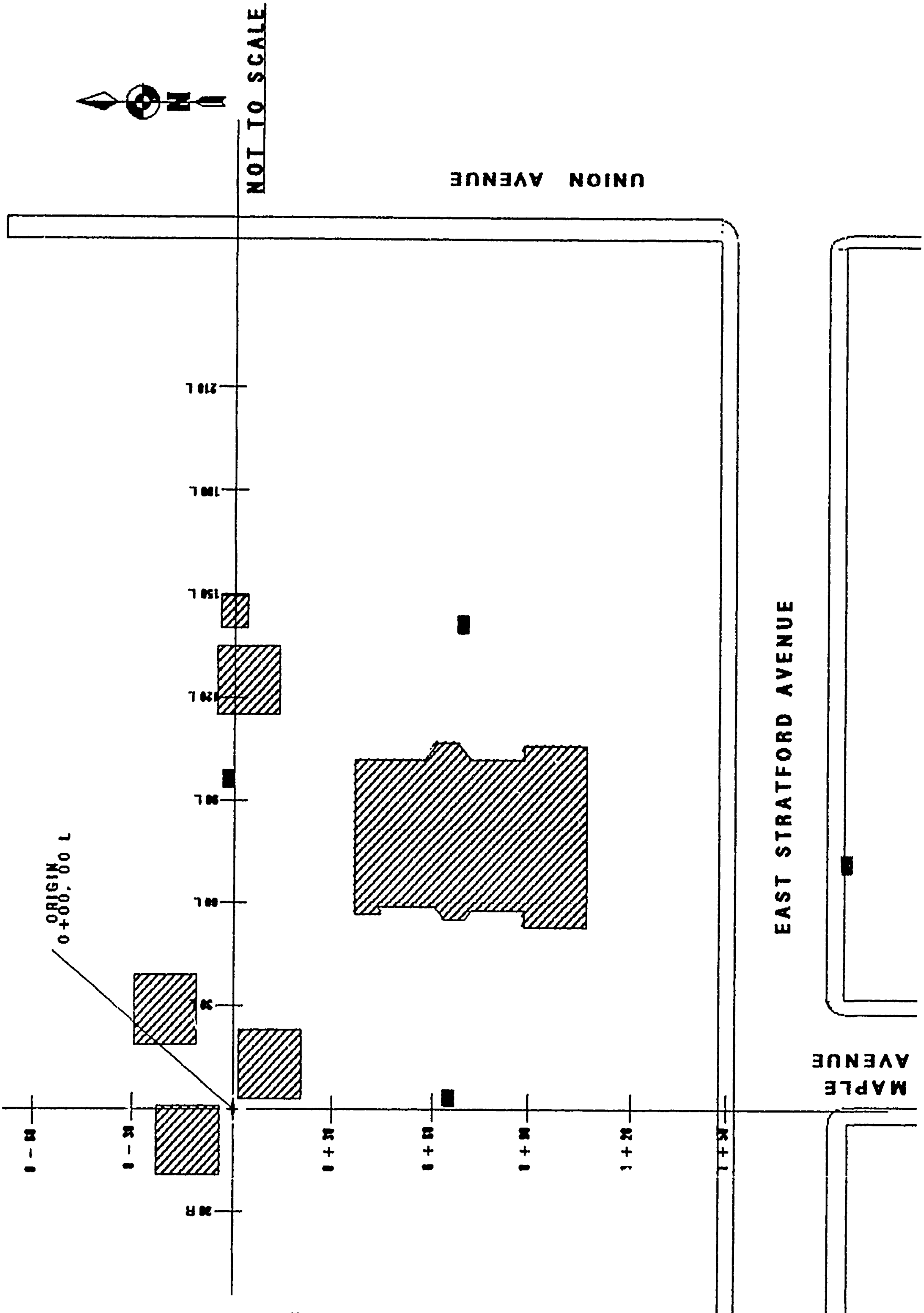


FIGURE S.4 REMEDIATED STRUCTURES

6-G-344

LANSDOWNE

RADIOACTIVE RESIDENCE COMPLEX
DISMANTLEMENT/REMOVAL PROJECT

RADIOLOGICAL CLOSEOUT REPORT

CHEM-NUCLEAR SYSTEMS, INC.
220 STONERIDGE DRIVE
COLUMBIA, SOUTH CAROLINA

CHAPTER 7
INSTRUMENTATION

CHAPTER 7

INSTRUMENTATION DATA SUMMARY

TABLE OF CONTENTS

1.0 INTRODUCTION

The instruments utilized on this project included gamma scintillation detectors, alpha scintillation detectors, Geiger-Mueller detectors, gas proportional meters, and ion chambers. This section summarizes how each instrument was used and what types of checks were performed to insure the accuracy of that performance.

2.0 GENERAL

In accordance with the Contractor's Quality Control Plan, daily response checks were performed and documented for all portable survey instruments.

Instruments were sent to an off-site facility on a semi-annual basis to be calibrated against standards traceable to the National Institute of Standards and Technology. Each day of use, ten one-minute source checks were made on each portable instrument. These ten readings were used to generate an operational range for each instrument. The acceptable operational range was within two standard deviations of the mean, based on the ten one-minute source checks. The operational range values for each instrument were typically recalculated on a bi-weekly basis, immediately following return from repair, or when other external conditions such as a change in background level made the calculated range obsolete. In the event that the equipment did not meet the daily pre-utilization response check requirements or failed in use, the instrument was withdrawn from use and labeled "Hold For Inspection". If the instrument was found to be defective, it was returned to the CNSI Barnwell facility, in the case of CNSI equipment, or a certified vendor in the case of rental equipment, for repair and recalibration. All records of pre-utilization response checks were maintained.

3.0 INSTRUMENTATION

3.1 GEIGER-MUELLER DETECTORS

The Geiger-Mueller detectors used at this site included the Ludlum 44-9, Eberline HP-260, and Eberline HP-210. These detectors were used with the Ludlum-177, Eberline E-120, Eberline RM-14, or Eberline RM-21-1 ratemeters. An Eberline BC-4 scaler, which has a built in detector, was also used. These instruments detect beta and gamma radiation, and are highly sensitive. Because of their sensitivity, they were used at the access control point to detect contamination on personnel. The BC-4 scaler was used for analyzing swipes. Other uses at Lansdowne consisted of surveying rubble, controlled release of tools and equipment, and free release

of all tools and equipment used at the site. All instruments were response checked, daily prior to utilization, with a Tc-99 source having an activity of 18,200 disintegrations per minute (DPM). Detection efficiency was calculated by dividing the counts per minute (CPM) by the DPM of the source. The average efficiency of these instruments ranged from 13 and 16 percent.

3.2 ALPHA SCINTILLATION DETECTORS

The alpha scintillation detectors used at this site were two M-2000 alpha scalers. They were used to analyze air samples, water samples, and swipe samples. To insure the accuracy of their performance, reliability factors were calculated on a daily basis, and documented. To determine a reliability factor, a series of 10 one-minute source counts were made with a Th-230 source having an activity of 13,700 DPM. The average count was calculated, as well as the standard deviation. The reliability factor was calculated by dividing the standard deviation by the square root of the average. The reliability factor was acceptable if the value was greater than 0.64 and less than 1.22.

Once the reliability factors were determined to be in the acceptable range, instrument detection efficiencies were determined. The average efficiency of these instruments ranged between 29 and 33 percent. Variations in the calculated efficiency of greater than 1.5% in consecutive calculations was considered suspect, and the operational status of the instruments was investigated further. Each time the instrument was repaired and re-coated with phosphorous material, the efficiency changed.

3.3 GAMMA SCINTILLATION DETECTORS

The gamma scintillation detectors used at the site included the Ludlum-44-10 and the Eberline SPA-3, both of which use 2" by 2" NaI(Tl) crystals. The detectors were used with the Ludlum-2220 and Eberline ESP-1 portable scaler/ratemeters. The Opposed Crystal System (OCS), which uses two 3" by 3" NaI(Tl) crystals connected to an MCA, was used in the laboratory trailer to analyze soil samples. Gamma scintillation detectors provide a sensitive method for detecting low levels of low energy gamma radiation. Cross-correlating the scintillation detectors with the Reuter-Stokes RS-111 Pressurized Ionization Chamber (PIC) provided the capability of converting the observed count rate readings to exposure rate in micro-roentgen per hour. Data from these correlations is shown in Appendix P at the end of Chapter 6.

3. OPPOSED CRYSTAL SYSTEM

The Opposed Crystal System is a gamma spectroscopy system developed by Argonne National Laboratories and successfully utilized for the Department of Energy by Chem-Nuclear Systems, Incorporated since 1983. The gamma spectroscopy system used for the Lansdowne Project consisted of a Canberra Model 35 Plus Multichannel analyzer with two Bicron Model 3M3 3 inch by 3 inch Sodium Iodide detectors.

The Opposed Crystal System was utilized at Lansdowne for analyzing all soil samples, using the following procedure. Samples were collected and placed into aluminum, teflon coated cans, which were then weighed. The sample was counted in the Opposed Crystal System for a period of 500 seconds. This was an initial count which was used to estimate the soil activity. The initial count was useful when making decisions regarding the need to continue excavation in an area. After the initial count, the can was sealed to allow the radium daughters to ingrow and come to equilibrium over a period of at least twenty days. After at least twenty days, the sample was again counted to get the final radium concentration based on measurement of the Bi-214 daughter. The Opposed Crystal System had a minimum detectable activity of 1.046 picocuries per gram.

3.5 GAS PROPORTIONAL METERS

The gas proportional meters used at this site were PAC-4G's with AC-21 probes. The AC-21 is an alpha detector, and the PAC-4G is a ratemeter. This instrument was utilized for surveys to free release furniture and personal property belonging to the owners of the 105/107 structure It was also used to determine initial CPM values on air samples taken in the field.

3.6 IONIZATION CHAMBERS

The ionization meters used at this site were the Eberline E-520, the Reuter-Stokes RS-111 Pressurized Ionization Chamber, and Self Reading Pocket Dosimeters (SRPD). The ionization chamber differs from the other instruments used at the site in that it measures gamma exposure rates rather than gamma events.

The E-520's were used for determining contact dose rates in the structures as part of the determination of whether tarpaulins or containments would be necessary for dismantlement, and for dose rating B-25 boxes prior to shipment. The Pressurized Ionization Chamber was used for determining dose rates in work areas prior to soil excavation, and for cross-correlating the

gamma-scintillometers.

In accordance with Appendix D of the Contractor's Quality Control Plan, SRPD's were available to all on site personnel and visitors upon specific request. While the gamma radiation levels encountered on site were greater than background gamma radiation levels, the typical external dose to workers did not exceed 500 millirem per year, which is the limit for nonoccupationally exposed personnel.

3.7 CONTINUOUS AIR MONITORS

Throughout the remedial action phase of the project, the site utilized seven Continuous Air Monitors (CAM's) which monitored for alpha radiation and five Continuous Air Monitors (CAM's) which monitored for beta-gamma radiation. This group included several units used as backup and to replace units sent off-site for repair or calibration. The units were operated in the following manner:

Air was drawn through a 0.8 micron glass fiber filter which was continuously monitored by a built-in detector. The detector data was output to a printer, which logged the real-time reading of the airborne concentration on a strip recorder.

These instruments provided a graphic representation of the relative airborne concentration. While they provide an excellent method for analyzing an increasing, steady, or decreasing trend in the airborne concentration, they are not designed to provide a quantitative measurement. Therefore, gross alpha and radiochemical analysis of the filters which were used in the CAM(s) was performed. In this way a quantitative measurement of the environmental airborne concentrations was made.